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CANADA-ONTARIO AGREEMENT

OBJECTIVE 2.1:

PRIORITY PESTICIDES

Confirmation of No Production, Use or Import
in the Commercial Sector in Ontario

Environmental Protection Branch - Ontario Region
Environment Canada

Environmental Sciences and Standards Division
Ontario Ministry of Environment and Energy

October 1996

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ACRONYMS

AMO:	Association of Municipalities of Ontario
AMRC:	Association of Municipal Recycling Coordinators
BAF:	Bioaccumulation factor
BCF:	Bioconcentration factor
CEPA:	Canadian Environmental Protection Act
COA:	Canada-Ontario Agreement
DOE:	Department of Environment
FASE:	Foundation for Advancements in Science and Education
HHW:	Household hazardous waste
IMEP:	Importation for Manufacturing and Export Program
IJC:	International Joint Commission
MOEE:	(Ontario) Ministry of Environment and Energy
OC:	Organochlorine
OMAFRA:	Ontario Ministry of Agriculture, Food and Rural Affairs
PAC:	Pesticide Advisory Committee (provincial)
PCPA:	Pesticide Control Products Act (federal)
PMRA:	Pest Management Regulatory Agency (federal)
PA:	Pesticides Act (of Ontario)
TSMP:	Toxic Substances Management Policy (federal)
USFDA:	U.S. Food and Drug Administration

EXECUTIVE SUMMARY

To fulfill COA Objective 2.1, this report presents data and information to document zero discharge of the priority pesticides: aldrin, dieldrin, chlordane, DDT, mirex and toxaphene to the Great Lakes Basin ecosystem, from the commercial sectors of Ontario. As a result, other actions (such as, lake-wide management plans, remediation, and international action), can proceed with greater assurance in dealing with the quantities that are circulating or otherwise entering the ecosystem.

This report presents findings in the following areas as a means of confirming zero discharge:

- Review of registration and regulation status;
- Review of manufacturing, import and export;
- Review of compliance by commercial distributors and applicators; and,
- Review of use for agricultural purposes.

Potential sources from household hazardous waste, although outside this objective, were also reviewed.

Federal registration for the active ingredients and end-use products of aldrin, dieldrin, chlordane, DDT, and toxaphene has been discontinued and provincially, these pesticides have been banned. In the case of mirex, federal registration and provincial classification was never granted for pesticidal use. The review of the historical manufacturers of the priority pesticides show that there are no manufacturers in Canada of these pesticide active ingredients or their end-use products. Although DDT is not being manufactured as commercial pesticides (i.e. solely as active ingredients or for use in an end-use product), DDT is a micro-contaminant by-product of the registered active, dicofol.

Border auditing is conducted by Agriculture Canada and Customs for pesticides. Pesticides that are not legally registered in Canada are refused entry and returned to exporter. The Importation for Manufacturing and Export Program for Pest Control Products does not allow importation of the COA priority pesticides for the purposes of reformulation and subsequent export to more lenient jurisdictions. Banned pesticides are not suspected to be illegally imported, as substantiated by pesticide residue monitoring of domestic food commodities. With respect to export, notifications would be required to export COA priority pesticides under the Canadian Environmental Protection Act and none have been received.

The conclusions of the various surveys and inspections conducted by MOEE confirm that outstanding stocks of the banned pesticide within the commercial distribution and application sectors were collected and disposed of by contract to a secure landfill prior to the provincial regulatory ban

in 1994. The order of magnitude of the collected stocks was in the range of hundreds of kilograms. There is no further evidence to suggest that the banned pesticides are being commercially applied or distributed at present.

The Ontario Waste Agricultural Pesticide Collection Program 1991-92, conducted by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), collected outstanding pesticide products with the banned pesticides. Some stocks may still inadvertently be stored by Ontario farmers. An extension of the amnesty period, however, may be warranted. There is no further evidence to suggest that the banned pesticides are being used on agricultural crops, as provided by provincial pesticide residue monitoring.

Review was conducted under this objective to determine whether any quantities of banned pesticides were collected by Ontario municipalities. No formal collection programs similar to those mentioned above have been conducted for the target pesticides in the HHW sector. Since, municipalities do not quantify pesticides by active ingredients, it could not be determined how much of the banned pesticides were being unknowingly used or retained by homeowners. However, screening visits to two household hazardous waste depots indicated that homeowners are storing some quantities of these banned pesticides. The Regional Municipality of Peel is conducting a six month survey to determine the quantities of the COA priority pesticides being collected at its household hazardous waste depot.

The conclusions reached in this report are based on weight of evidence. This report concludes that within the commercial sector of this province, there is effectively zero use and stock availability of the priority pesticides as commercial pesticides. Training and education could be undertaken to supplement past work programs.

This report also concludes that quantities (appropriate for domestic uses) of COA priority pesticides may be retained by homeowners as household hazardous waste. Further resources could be allocated for collections in household hazardous waste, however, the cost of such collections may be prohibitive. Indicators suggest that pesticides, as a whole, make up less than one per cent of household hazardous waste.

1.0 INTRODUCTION

1.1 Canada-Ontario Agreement and Objective 2.1

On July 6, 1994, the federal Minister of Environment and the Ontario Minister of Environment and Energy signed a six year Canada-Ontario Agreement (COA) which called for co-ordinated action to restore, protect and sustain the Great Lakes Basin ecosystem. Under COA, both governments, committed to working jointly on three streams. These streams are:

Stream I: Restoration of degraded areas;
Stream II: Prevention and control of pollution; and,
Stream III: Conservation and protection of human and ecosystem health.

Each stream has specific objectives and a total of 40 measurable results to be met by the year 2000. Within Stream II, substances of particular concern are identified on two tiers. Substances on Tier I are slated for early virtual elimination through elimination of their use, generation or release into the Great Lakes environment. Substances on Tier II have a demonstrated potential to impair the Great Lakes ecosystem and will be subject to research and voluntary reduction at source. Specific time lines and targets for achieving their virtual elimination will also be established.

In Objective 2.1 under COA Stream II, Canada and Ontario agreed to:

"Confirm by 1996 that zero discharge has been achieved for 5 priority substances [on Tier II].

Manufacturers, distributors and commercial applicators of pesticides in Ontario will be held accountable for confirming that no production, use or importation, of aldrin/dieldrin, chlordane, DDT, mirex and toxaphene occurs to the Great Lakes Basin. Holders of supplies of these orphaned pesticides will be encouraged, through an amnesty under the Pesticides Act (Ontario), to cooperate in the collection and safe disposal of remaining quantities. Together these actions will assure that zero discharge has been met for these compounds."

The definition of *zero discharge* that has been used in the context of this objective is that of the Virtual Elimination Task Force of the International Joint Commission, which is, as applied to a chemical: *"adopting measures to eliminate any use or synthesis or its existence*

anywhere in society"[1]. Significant progress toward this goal is made when sources, i.e. inputs into the environment are eliminated. In the context of this objective, the commercial sectors are considered as potential sources. The IJC's Task Force further states, however, that it: *"recognizes that minuscule quantities of persistent toxic substances already in the environment may escape capture or interception before entering the Great Lakes, even with the application of prevention, treatment and control measures"*, and *"previous laws, regulations and courts have also recognized the reality that application of the zero discharge philosophy cannot necessarily mean achievement of absolute zero"*[1].

References:

- [1] International Joint Commission, "A Strategy for Virtual Elimination of Persistent Toxic Substances - Volume 1, August 1993 p.10.

1.2 Purpose of this Report

This report provides the results of programs within the Province of Ontario and Environment Canada - Ontario Region, that are evidence of stock availability/unavailability and use/lack of use of the COA priority pesticides: aldrin, dieldrin, chlordane, DDT, mirex and toxaphene. Specifically, results in the following areas have been reviewed and documented:

- Status of federal registration and provincial classification;
- Status of manufacture, import and export;
- Compliance by commercial applicators and distributors; and,
- Use for agricultural purposes.

Pesticides in the household hazardous waste, although outside this COA objective, were also reviewed.

An overview of recent scientific findings for each priority pesticide is given in Appendix A to provide context for the fate, sources and trends of these pesticides in the environment. Also for overview, the Ontario Preliminary Environmental Assessment for each of the pesticides is given in Appendix A and an outline of the federal and provincial frameworks for pesticides is provided.

2.0 SUBSTANCE OVERVIEW

2.1 Reasons for the Bans of these Pesticides

Aldrin, dieldrin, chlordane, DDT, mirex, and toxaphene are chlorinated hydrocarbon insecticides that are toxic, very persistent in the environment and have the potential to bioaccumulate. Federally, registration for these pesticides has been discontinued and provincially, these pesticides have been banned. Less hazardous insecticides and those more highly specific to target pests are now used in place of these insecticides.

In 1985, the Great Lakes Water Quality Board of the International Joint Commission (IJC) identified 11 Critical Pollutants. Dieldrin, DDT and its metabolites, mirex, and toxaphene were among the pollutants named to this list. The IJC Critical Pollutants are considered a threat to the health and life within the Great Lakes ecosystem. The IJC has recommended that a focused strategy should be implemented to virtually eliminate inputs of these pollutants to the ecosystem. This COA objective is a means by which this broader goal can be addressed in part.

2.2 Fate, Sources and Trends: Recent Findings

This report focuses on potential inputs of priority pesticides from commercial sources. Appendix A provides background as to the most recent findings into fate, sources and trends of quantities that are present or circulating in the Great Lakes ecosystem. To obtain this overview, literature searches (covering 1990 to present) were conducted on the following¹:

- Science Citation Index;
- Current Contents;
- Environmental Abstracts;
- Chemical Abstracts;
- SWETSCAN;
- Wildlife Worldwide;
- USEPA libraries; and,
- Chemical Evaluation and Retrieval System (CESARS).

The State of the Great Lakes (1995) Report and Report Highlights may also be referred to for an overview of the health of the ecosystem basin-wide and lake by lake [1].

¹ Searches were done on the specific priority pesticides, rather than the general category of organochlorines. This was for the purpose of identifying key findings specific to these substances.

References:

- [1] State of the Great Lakes, Environment Canada, U.S. Environmental Protection Agency. 1995.
- [2] International Joint Commission Biennial Reports, Great Lakes Regional Office, Windsor, Ontario.

3.0 FEDERAL AND PROVINCIAL FRAMEWORKS FOR PESTICIDES

Sections 3.1 and 3.2 of this chapter describe the federal and provincial frameworks for pesticides as they formally exist now. At present, provincial classification/scheduling can be more restrictive but not less restrictive than the federal registration. Section 3.3 describes the municipal jurisdiction. Appendix C gives definitions and more detail on the federal and provincial frameworks.

3.1 Federal Registration of Pesticides

The *Pest Control Products Act (PCPA)* governs the registration, use, packaging, and labelling of pesticides. Any product *imported into, sold or used* in Canada must first be registered under the PCPA. The PCPA is administered by Health Canada through the Pest Management Regulatory Agency (PMRA).

The PCPA requires that all pesticides used in Canada undergo review before registration by the PMRA, for environment, health and efficacy information. Precautionary symbols and words are legally required to be shown on the label of a pesticide product. The federal registration of products falls into four categories. A product may be registered into only one of these categories. In order of increasing hazard, these categories are [2]:

- Domestic;
- Commercial (also referred to as: agricultural, industrial or institutional);
- Restricted; and,
- Manufacturing

The “manufacturing” product class is a technical grade or concentrate of the product. Such products may be sold for both end-use and manufacturing purposes but as such would require appropriate registration for both.

The *types of registration status* in Canada that are possible are ² [2]:

- Never Registered (research permits must be obtained for research trials to be conducted with a new unregistered product);
- Restricted;

² The following types of registration and their definitions were in effect while the priority pesticides were being “de-registered”.

- Discontinued (this action is also referred to as "*voluntary withdrawal of registration*" or "*registration not renewed*");
- Suspended (this action bans distribution through wholesale trade by the registrant. Stock remaining in the retail market may be sold legally until the end of the given five year registration period); and,
- Cancelled (a cancellation results in the *immediate ban of all trade: wholesale, retail sale and use*, of the product and is the most severe regulatory action).

Both the active and end-use products must be federally registered. The "active ingredient" (a.i.) is the substance within the product which controls the target pest. An "end-use product" contains the active ingredient plus various formulators ingredients. An active ingredient must be registered before an end-use product can be registered, although simultaneous registration of active and end-use products may occur.

An end-use product must have a registration for each of its individual uses and as a legal requirement, all permissible uses of an end-use product must be listed on the product label. For example, an end-use product that is registered for use solely on one crop cannot legally be used on any other crops. An application must be made by the registrant to amend the product registration for any additional crops.

3.2 Ontario Classifications of Pesticides

In Ontario, the Pesticides Act of Ontario governs the distribution, sale, storage, handling, use and disposal of pesticides. Ontario Regulation 914/90. Under the Pesticides Act, Ontario Regulation 914/90 regulates distribution, availability and use of pesticide products in Ontario. The disposal of pesticides is also covered by the Ontario Environmental Protection Act, under the General Waste Management Regulation (Regulation 347/90).

In general, a product is proposed for inclusion into a schedule of Regulation 914/90 after application for registration. This proposal is published in the Ontario Gazette and as a result, the product has "interim" status for an 18 month period or until assignment to a schedule. Each fall the provincial Pesticide Advisory Committee (PAC) reviews all interim products and gives recommendations for continued interim status, removal or change to "full classification". Additional information may be requested of the applicant during the PAC's review. Full classification status is published in the Ontario Gazette.

A certificate of federal registration is required as proof before provincial classification can be given and there is no direct correlation between the provincial schedules and the type of

federal classification. Federal classification may be considered during the provincial review. As a result, this allows the province to be more restrictive but not less restrictive than the federal registration in the classification of a pesticide product. A pesticide product can be classified into one of six schedules in Regulation 914/90. These schedules are:

- Schedule 1: Restricted;
- Schedule 2: Agricultural and Commercial;
- Schedule 3: Consumer;
- Schedule 4: Unrestricted;
- Schedule 5: Restricted and Agricultural;
- Schedule 6: Container Limitations on Unrestricted.

Regulation 914/90 also places requirements on pesticide applicators in the application of pesticides. These include:

- Posting of warning signs;
- Notification of public and private owners;
- Restrictions on pesticide transportation, use and disposal;
- Age of applicators;
- Competence requirements; and,
- Insurance requirements.

Regulation 914/90 exempts the following from classification in the province:

- Mechanical devices which do not use chemical pesticides;
- Products used for extermination of microorganisms; and,
- Products containing pesticides, but which are not used as pesticides, such as: paints, soaps, and, wallpaper adhesives.

Reclassification of a previously classified product can occur, as a result of a review of additional information. Such a review can be initiated by the province or may be requested by the registrant.

3.3 Municipal Authority

Municipalities are both regulators (under provincial enabling legislation) and users of pesticides [1]. In general, municipalities can enact by-laws as they apply to pesticides for:

- Controlling nuisances;
- Waste disposal; and,

- Industrial use of sewers and related matters.

Municipalities may enact by-laws that restrict the use of pesticides through the local boards of health, when there are public health concerns. Municipalities can place restrictions or bans on use of pesticides that are used for city-owned property, private residences, commercial or industrial property [1].

Municipalities are users of pesticides for maintenance of municipal parks and municipal school property. Municipalities also have a responsibility to control certain noxious weeds, under provincial legislation [1].

References:

- [1] Estrin D. and Swaigen J., Environment on Trial: A Guide to Ontario Environmental Law and Policy, Third Edition, Emond Montgomery Publications Ltd., Toronto, Canada, 1993, Chapter 2.
- [2] Agriculture Canada, Registraton Handbook for Pest Control Products under the Pest Control Products Act and Regulations, February 1994.

4.0 REVIEW AND CONFIRMATION

This chapter summarizes the current status of federal registration and provincial classification of priority pesticides and follows from the overview of frameworks given in Chapter 3.

4.1 Registration and Classification Status

4.1.1 Federal Registration

All pest control products that are used in or imported into Canada must be registered under the Pest Control Products Act and regulations (i.e. have a Pesticide Control Products Registration Number) [12]. The "*Registered Pest Control Products*" database print-out of the Pest Management Regulatory Agency (April 1995) shows that aldrin, dieldrin, chlordane, DDT, mirex and toxaphene as not listed and as such, they do not have a legal Pesticide Control Products Registration Number. "*Historical Pesticide Actives by Product Type*" (Agriculture Canada, 1993) and "*Historical Actives Ingredients by Name*" also list the active ingredients: aldrin, dieldrin, chlordane, and DDT as de-registered through discontinuation; toxaphene was de-registered through suspension. As a result, end-use products cannot have valid registration if its given active ingredient is de-registered. Table 4.1 summarizes the registration and regulatory status of the priority pesticides. The status in the U.S. is also listed for context.

Federal registration for all products with actives: *aldrin* [16], *dieldrin* [17] and *chlordane* [18] were discontinued in 1990. This signifies that wholesale and retail sale of end-use products with these actives was permissible until 1995.

In 1990, (when trade and use was still permissible for aldrin, dieldrin, and chlordane), notification of the registration status of chlorinated hydrocarbon insecticides was given to the Canadian Association of Pest Control Officials (CAPCO), Public Interest Groups and User Groups by Agriculture Canada in CAPCO Note 90-02. In 1990, remaining uses were restricted to use by licensed Pest Control Operators to control subterranean termites and provincial use permits were required in each of these instances. The following regulatory options were listed in this Note:

- Cancellation of all registrations to stop sale and use of products;
- Suspension of all registrations to stop sale by registrants with a time frame for phase out of use; and,

- Discontinuation of all registrations at renewal on December 31, 1990 at the registrant's request (with the exception of DDT, which was already discontinued as of December 1985).

The regulatory option pursued in Ontario was "cancellation of registrations" as described in Section 4.1.2 of this report.

Registration for **DDT** active and remaining end-use products was discontinued in 1985. Wholesale and retail sale of DDT active and end-use products was thus permissible until 1990 [11].

Mirex was not federally registered for use as a pesticide in Canada, so de-registration was not necessary [19]. Mirex was used in Canada as a flame retardant. The Canadian Environmental Protection Act (CEPA), however, prohibits the import, manufacture, processing, offer for sale or use of mirex in Canada, under Schedule I.

Toxaphene, as a pesticidal active ingredient was suspended from its last remaining uses in 1980 [11], except for one essential veterinary use. This veterinary use was voluntarily discontinued in 1992, also [15]. The suspension action put a stop to manufacture and wholesale, however, retail sale of product was permitted until 1985.

Research and Quantity Exemptions

Under Section 5 of the Pest Control Products Regulations, a control product is exempt from registration if it is used for the research purposes. As well, the Regulations do not apply to control products that are imported in total quantity less than 500 grams or 500 millilitres. This allows for import of control products for laboratory use, for example.

4.1.2 Ontario Classification

The pesticide actives: aldrin/dieldrin, chlordane, DDT and toxaphene are prohibited in summary in Ontario Regulation 162/94. Regulation 162/94 revisions were incorporated into Regulation 914/90 under the Pesticides Act of Ontario. Regulation 914/90 contains the schedules that list the pesticide products that can be legally used in Ontario. Under Section 62 of Regulation 914/90:

- (1) *No person shall use, handle, store, sell, transport or dispose of a pesticide that contains aldrin, chlordane, chlordecone, dichlorodiphenyltrichloroethane (DDT), dieldrin or endrin.*
- (2) *Despite subsection (1), a pesticide described in that subsection may be managed and disposed of as a hazardous waste in accordance with the Environmental Protection Act and the regulations under that Act.*

The prohibition under Regulation 162/94 strikes out specific pesticide products from the listing in Regulation 914/90. In 1988, Regulation 717/88 struck the last remaining products with DDT active from the legal schedules in 1988. Table 4.2 summarizes the last products, their registrants and agents, that had legal classification in Ontario under Regulation 914/90. Table 4.2 shows that, in 1990, there were only two products, both with restricted classification left legally classified for each of aldrin and dieldrin; and, there were seven products in total with commercial, consumer and unrestricted classification for chlordane.

Mirex was never scheduled under the Ontario Pesticides Act and therefore, no products were struck from the schedules. Chlordecone, an active ingredient, which is a decomposition product of mirex, was however scheduled and subsequently banned under Regulation 162/94.

TABLE 4.1: REGISTRATION AND CLASSIFICATION STATUS OF COA PRIORITY PESTICIDES

PESTICIDE ACTIVE	USE	FEDERAL REGISTRATION STATUS	ONTARIO CLASSIFICATION STATUS	U.S. STATUS
Aldrin	<ul style="list-style-type: none"> • Insecticide (broad cover) 	<ul style="list-style-type: none"> • Presently not registered for pesticide use in Canada [1]. • Registration was discontinued in 1990 (i.e. wholesale and retail sale was acceptable until 1995, but no manufacture was permitted) [2]. • Listed as a substance which requires notification if exported [3]. 	<ul style="list-style-type: none"> • Banned in summary in Ontario Regulation 162/94, (i.e. use, handling, storage, selling, transport and disposal is prohibited). <p>(Regulation 162/94 amends Regulation 914/90, under the Pesticides Act of Ontario which lists the products that can be legally used in Ontario).</p>	<ul style="list-style-type: none"> • Banned by USEPA on October 1, 1974 [5].
Dieldrin	<ul style="list-style-type: none"> • Insecticide (for corn, termite control, moth control on clothing and carpets) 	<ul style="list-style-type: none"> • Presently not registered for pesticide use in Canada [1]. • Registration was discontinued in 1990 [2]. • Listed as a substance which requires notification if exported [3]. 	<p>(Disposal of pesticides is also covered under the Ontario Environmental Protection Act, General Waste Management Regulation 347/90.)</p>	<ul style="list-style-type: none"> • Banned [6] and but there may be some non-agriculture applications [7].
Chlordane	<ul style="list-style-type: none"> • Insecticide (for control of termites; and, control of fruit and vegetable pests) 	<ul style="list-style-type: none"> • Presently not registered for pesticide use in Canada [1]. • Registration was discontinued in 1990 (i.e. wholesale and retail sale acceptable until 1995, but no manufacture was permitted) [2]. • Listed as a substance which requires notification if exported [3]. 		<ul style="list-style-type: none"> • Restricted in January 1981 to use for termite control [8]. Cancellation occurred in 1978, 1979, 1980 for use to control ants [8].

PESTICIDE ACTIVE	USE	FEDERAL REGISTRATION STATUS	ONTARIO CLASSIFICATION STATUS	U.S. STATUS
DDT	<ul style="list-style-type: none"> Insecticide (broad cover) 	<ul style="list-style-type: none"> Presently not registered for pesticide use in Canada [1] Registration was discontinued in 1985 (i.e. wholesale and retail sale was acceptable until 1990, but no manufacture was permitted) [11]. Listed as a substance which requires notification if exported [3]. 	<ul style="list-style-type: none"> Banned in summary in Ontario Regulation 162/94, (i.e. use, handling, storage, selling, transport and disposal is prohibited). <p>(Regulation 162/94 amends Regulation 914/90, under the Pesticides Act of Ontario which lists the products that can be legally used in Ontario).</p> <p>(Disposal of pesticides is also covered under the Ontario Environmental Protection Act, General Waste Management Regulation 347/90.)</p>	<ul style="list-style-type: none"> Banned as of 1972 [9].
Toxaphene	<ul style="list-style-type: none"> Insecticide (for use on fruits, vegetables, corn, grain, cotton; for control of ecto-parasites). 	<ul style="list-style-type: none"> Not registered for pesticide use in Canada [1] Suspended as of October 1980 (suspended status implies that retail sale was acceptable until 1985; no wholesale permitted) [2]. 		<ul style="list-style-type: none"> All major uses were cancelled in 1982 by the USEPA [10]. Some uses may still be registered but these are believed to be at low level use [10].
Mirex	<ul style="list-style-type: none"> Main use: flame retardant for plastics, rubber, paint, paper, electrical goods. Insecticide (control of fire ants, which pose a human health risk). 	<ul style="list-style-type: none"> NEVER registered or used in Canada by the agricultural industry [2]. Mirex was, however, used in Canada for fire retardant uses [4]. Prohibited import, manufacture, processing, offer for sale and use of mirex under CEPA [13]. Listed as a substance which requires notification if exported [3]. 		<ul style="list-style-type: none"> All U.S. federal registrations for its use were cancelled in March 1971 by USEPA [2].

References:

- [1] Historical Pesticide Actives by Product Type. Agriculture Canada. August 1993.
- [2] Pesticide Management Regulatory Agency, Health Canada, 1995.
- [3] *Canadian Environmental Protection Act: Part II, Schedule II: List of Toxic Substances Requiring Export Notification* (as of December 1992).
- [4] Mirex, Environmental Health Criteria Document, Environmental Health Directorate, Health Protection Branch, September 1977.
- [5] Chemical Evaluation Search and Retrieval System (CESARS), Ministry of Environment and Energy and Michigan Department of Natural Resources, Issued: November 1994, Aldrin, Reference R-27.
- [6] CESARS, Issued: November 1994, Dieldrin, Reference R-21.
- [7] CESARS, Issued: November 1994, Dieldrin, Reference R-22.
- [8] CESARS, Issued: November 1994, Chlordane, Reference R-102.
- [9] MOEE Candidate Substances for Bans, Phase-outs or Reductions - Multimedia Revision, October 1993, p.B-10.
- [10] CESARS, Issued: November 1994, Toxaphene, Reference R-254.
- [11] Canadian Association of Pesticide Control Officials (CAPCO) Note 90-02, Agriculture Canada/Pesticide Management Regulatory Agency, February 15, 1990.
- [12] Registration Handbook for Pest Control Products Under the Pest Control Products Act and Regulation, Agriculture and Agri-Food Canada, February 1994.
- [13] Canadian Environmental Protection Act, Schedule I, List of Toxic Substances.
- [14] Trade Memorandum T-1-231, Agriculture Canada, Food Production and Inspection Branch, October 31, 1980.
- [15] Toxaphene Fact Sheet, PMRA (see Appendix E: Selected References)
- [16] Aldrin Fact Sheet, PMRA (see Appendix E: Selected References)
- [17] Dieldrin Fact Sheet, PMRA (see Appendix E: Selected References)
- [18] Chlordane Fact Sheet, PMRA (see Appendix E: Selected References)
- [19] Mirex Fact Sheet, PMRA (see Appendix E: Selected References)

4.2 Manufacture, Import and Export

4.2.1 Manufacture

Table 4.2 lists the last remaining set of historical registrants and their historical pesticide products, which were legally classified in Ontario and were subsequently de-classified under Ontario Regulation 162/94. Both in-country and out-of-country registrants are listed in Table 4.2. (An out-of-country registrant must have a Canadian agent, under the federal registration process.) Review shows that the *only remaining potential Canadian reformulators* who could have produced priority pesticide end-use products were:

- Ciba Geigy Canada Ltd., Mississauga, Ontario (for aldrin, dieldrin);
- Sanex Inc., Mississauga, Ontario (for chlordane); and,
- Vigoro Division, Swift Canadian Co., Toronto, Ontario (for chlordane).

Before the ban under Regulation 162/94, MOEE Standards Development Branch conducted a stakeholder consultation of registrants of the banned pesticides. COA priority pesticides or their end-use products are not being manufactured/reformulated in Ontario.

The manufacture of COA priority pesticides in the world is briefly outlined in Box 4.1 to provide context.

Registered Products and Contamination

Although DDT active and end-use products have been de-registered, DDT is produced as a micro-contaminant during the manufacture of dicofol, a registered active. In 1990, Agriculture Canada, the department responsible for pesticide registrations, required that the registrant meet or do better than a standard of 0.1% contamination (down from 2.5-6% contamination) in these products. This standard was met [7].

In Ontario, there are 11 products are classified with dicofol active. Of these products, nine are classified as Schedule 2 (Agricultural and Commercial) and two are classified as Schedule 3 (Consumer) [7]. The 1993 Survey of Pesticide Use by OMAFRA lists use of dicofol on field crops, fruits and vegetables as 8,372 kg of active. This amounts to approximately 8.4 kg of DDT release for this source, based on 0.1% DDT contamination. This is down from approximately 209-502 kg at the previous levels of 2.5-6% contamination.

Dicofol has been identified as a Pesticide of Concern under COA Objective 2.7: Pesticides Review. Under Objective 2.7, pesticides are to be reviewed in terms of risk reduction. The Pest Management Regulatory Agency, under Health Canada, is subject to the federal Toxic Substances Management Policy (TSMP). Under the TSMP, DDT is listed as a substance for virtual elimination from the environment.

BOX 4.1: MANUFACTURE OF COA PRIORITY PESTICIDES IN THE WORLD

Manufacturers of the COA priority pesticides in the U.S. are:

- Aldrin: Shell Chemical Company, 2401 Crow Canyon Road, San Ramon, California, 94538 [2].
- Chlordane: Velsicol Chemical Corporation, 5600 N. River Road, Rosemont, Illinois, 60018-5119 [2]
- Toxaphene: Hercules Inc., Synthetics Department, Brunswick, GA. [2]
Sonford Chemical Co., Port Neches, Texas [2]

At present, there are no regulations in the U.S. to prohibit the sale of U.S. banned pesticides for export. The Foundation for Advancements in Science and Education (FASE) has produced a report on export of U.S. banned pesticides for export, as a result of review of U.S. Customs records [3]. The report lists COA priority pesticides among those that are exported. Export occurs to developing countries, namely Latin America, South America, China, Japan and south-east Asia [3]. Canada is not listed as a receiving country in the FASE report. The FASE report states that the volume of banned, un-registered and restricted use pesticides that were exported from the U.S. increased twelve percent in 1991 over 1990 levels. The following amounts of COA priority pesticides which listed were as exported from the U.S. to developing countries.

Pesticide	Pounds Exported in 1991
Chlordane	1,143,012 lbs
DDT	191,590 lbs
Mirex	1,056,612 lbs

Globally, DDT is produced at Pieve-Vergonte, Italy by EniChemi Synthesis at a 6,000 metric tonne per year plant [4]. EniChem sells DDT to among others: Rohm and Haas Italia Srl; Industrias Prodotti Chimici SpA in Italy; Hoechst AG in Germany; and, Lainco SA in Spain [4]. The producer Elf-Atomchem had a 10,000 metric tonne per year plant at Jarrie, France that was closed in 1988 [4]. DDT is used in the production of dicofol and production for export still occurs for this purpose in Western Europe [4]. DDT is produced from monochlorobenzene and 1989 consumption of monochlorobenzene (as an indicator of DDT production) was at 3,000 metric tonnes in Western Europe [4]. At the same time, a decline has been noted for amounts of DDT used for agriculture in developing countries [4].

TABLE 4.2: HISTORICAL PRODUCTS, REGISTRANTS AND AGENTS IN ONTARIO OF PRIORITY PESTICIDES*Notes:*

- The products listed in the table below were the last remaining products which were in schedules of Regulation 914 and were subsequently struck from these schedules under Regulation 717/88 and Regulation 162/94.
- An out-of-country registrant must have a Canadian agent under the federal registration process. An agent is the registrant's legal representative.

PROVINCIAL SCHEDULE	REGISTRATION NO.	HISTORICAL PRODUCT REGISTERED IN ONTARIO	HISTORICAL REGISTRANT / REGISTRANT CODE	HISTORICAL AGENT / AGENT CODE
ALDRIN				
Schedule 1: Restricted	6468	Shell Aldrin 40 EC Insecticide	Shell International Chemical Company, Agrochemical Division, Shell Centre, London, England, SE1 7PG. (SHM)	Ciba Geigy Canada Ltd., 6860 Century Avenue, Mississauga, Ontario. (CGC)
Schedule 1: Restricted	17880	Aldrin 400 DC Insecticide	Ciba Geigy Canada Ltd., Mississauga, Ontario. (CGC)	None.
DIELDRIN				
Schedule 1: Restricted	4385	Shell Dieldrin 20 EC Insecticide	Shell International Chemical Company, London, England.	Ciba Geigy Canada Ltd., Mississauga, Ontario. (CGC)
Schedule 1: Restricted	17897	Dieldrin 200 EC	Ciba Geigy Canada Ltd., Mississauga, Ontario. (CGC)	None.
CHLORDANE				
Schedule 2: Agricultural & Commercial	12865	Chlordane 8E Emulsifiable Concentrate Insecticide	Sanex Inc., 5100-A Timberlea Blvd., Mississauga, Ontario, L4W 2S5. (SAF)	None.
Schedule 2: Agricultural & Commercial	17740	Chlordane C-100 EC Insecticide	Velsicol Chemical Corp., 5600 N. River Road., Rosemont, Il., 60018-5119, USA. (VEL)	CT Corp System Canada Ltd., 141 Laurier Ave. W., Suite 1000, Ottawa, Ontario., K1P 5J3.

PROVINCIAL SCHEDULE	REGISTRATION NO.	HISTORICAL PRODUCT REGISTERED IN ONTARIO	HISTORICAL REGISTRANT / REGISTRANT CODE	HISTORICAL AGENT / AGENT CODE
Schedule 2: Agricultural & Commercial	19722	Sanex Chlordane 8E EC Insecticide	Sanex Inc., Mississauga, Ontario (SAF)	None.
Schedule 3: Consumer	6024	Chloro 2 Insecticide	Sanex Inc., Mississauga, Ontario (SAF)	None.
Schedule 3: Consumer	11726	Vigoro Ant and Grub Killer	Vigoro Div. Swift Canadian Co., 1400 The Queensway, Toronto, On M8Z 1S4. (VIG)	None.
Schedule 3: Consumer	17607	Sanex Ant & Grub Killer	Sanex Inc., Mississauga, Ontario (SAF)	None.
Schedule 4: Unrestricted	11471	Green Cross Ant Trap	Ciba Geigy Canada Ltd., Mississauga, Ontario. (CGC)	None.
DDT				
Schedule 1: Restricted	8738	Poulin's Bat and Mouse Doom Powder	Poulin Exterminators, 24 Marion Place, Winnipeg, Manitoba, R2H 0S9	None.
Schedule 1: Restricted	10630	DDT 5% Pink Tracking Powder Rodenticide	Ditchling Corp. Ltd., P.O. Box 395, Don Mills, Ontario, M3C 2S7	None.
Schedule 1: Restricted	10686	DDT 50D Dust Concentrate	Ditchling Corp. Ltd., Don Mills, Ontario.	None.
Schedule 1: Restricted	12202	Sanex Rodentrak	Sanex Inc., Mississauga, Ontario.	None.

PROVINCIAL SCHEDULE	REGISTRATION NO.	HISTORICAL PRODUCT REGISTERED IN ONTARIO	HISTORICAL REGISTRANT / REGISTRANT CODE	HISTORICAL AGENT / AGENT CODE
MIREX				
NA	NA	<ul style="list-style-type: none"> Mirex was never registered as pesticide in Canada. Mirex is not classified in Ontario. No products with photomirex (chlordecone) are classified in Ontario under Reg. 914). 	NA	NA
TOXAPHENE				
NA	NA	<ul style="list-style-type: none"> No products listed as classified in Ontario under Reg. 914. 	NA	NA

4.2.2 Import

Border Auditing

Until March 1996, under the Pest Control Product Regulations, a "Declaration by Importer of Control Products", a form specific for pesticide products, had to accompany an imported control product for presentation at the border. This form has been updated to a "multi-commodity" Import Declaration form as of March 1996. Pesticide products, as well as food stuff and feed products are declared on this form. The following information must be listed on declaration forms, according to the regulations:

- Name and address of shipper;
- Name and brand of control product;
- Common and chemical name of the active and amount of active contained in the product;
- Total amount of product being imported;
- Name and address of importer; and,
- Purpose of the importation (using the words: resale, manufacturing; research, own use, re-export, analysis, seed production).

The Pest Control Products (PCP) Registration Number and Label Approval Number must also be listed on the declaration form. Legal registration is cross-checked against these numbers and laboratory analysis may also be conducted if necessary. An Agriculture Canada inspector is listed as a primary contact at each port of entry. This allows immediate action to be taken with respect to a control product: customs officers will hold the commodity until legal registration is verified. As a result, illegal product would not reach an importer. Products that are not legally registered are "Refused Entry", sent back to the exporter, and the declaration is identified as such.

In Ontario Region, declaration form statistics are compiled at the Food Production and Inspections Branch, Agriculture and Agri-Food Canada, Guelph, Ontario. Investigation lists from 1990-1996 have been reviewed and these show that there was only one instance which involved a COA priority pesticide. In this case, entry was refused for 5 cans of pesticide, named Superkill, originating from Korea. Laboratory analysis showed that it contained DDT, aldrin and lindane actives. The port of entry was in British Columbia, however, the importer was listed with an Ontario address. In follow up with the importer, the premises listed were found to be vacant. The product, in this case, was legally disposed of by officials [8].

Importation for Manufacture and Export

Regulatory Directive 95-05 for pesticides by the Pest Management Regulatory Agency is for the implementation of the Importation for Manufacturing and Export Program (IMEP). This directive is the result of consultation on a proposal set out in Discussion Document D94-05 (December 1994). The program was created with the cooperation of the four federal departments who were involved with pesticide registration at that time (i.e. Agriculture and Agri-Food Canada, Environment Canada, Health Canada and Natural Resources Canada).

The IMEP allows for the manufacture, import or formulation of pesticides that are not registered in Canada, if those pesticides are destined for sale to other countries. With respect to de-registered pesticides, however, the Regulatory Directive clearly states:

"Pest control products for which registration has been previously suspended, cancelled or voluntarily withdrawn in Canada because of health and safety or environmental impact concerns and pest control products which have been previously assessed for registration and found to be unacceptable are not eligible for IMEP" [1].

COA priority pesticides, therefore, could not be imported for the purpose of reformulation and subsequent export to more lenient jurisdictions.

Commodities Auditing

The Agri-Food Safety and Strategies Division of Agriculture Canada conducts monitoring, surveillance and compliance analysis of pesticide residues on domestic and imported food commodities, through the Pesticide Laboratory of Agriculture Canada/Pest Management Regulatory Agency. Agriculture Canada is responsible for ensuring that commodities, which are imported or shipped interprovincially, comply with Maximum Residue Limits (MRLs), which are set by Health and Welfare Canada in the Food and Drugs Act [5]. Compliance monitoring for registered use/misuse is also conducted [5].

A method for simultaneous analysis of over 200 residues, including those of aldrin, dieldrin, chlordane, DDT and its metabolites and mirex, is used³. Random sampling

³ Toxaphene is not included in the methodology since a sufficiently low detection limit is not attainable.

plans are established by the Agri-Food Safety and Strategies Division and shipments, loads and lots are sampled by Agriculture Canada inspectors [5].

The sampled loads of food commodities are held until analysis is complete and then they are either released or removed from commerce. Published data shows that Agriculture Canada analysed 13,230 samples of food commodities that were imported or shipped interprovincially over a 32 month period which ended December 31, 1991 [5]. Results for domestic commodities show that of 5,407 samples, there were 24 violations of MRLs (i.e. 0.44% of the samples tested). In comparison, of 7,823 imported commodities tested, there were 200 violations (i.e. 2.56% of the samples tested) [5]. A summary of results for domestic and imported commodities is given in Table 4.4. Commodities auditing is on-going.

Specifically, with respect to the priority pesticides, the number of hits which were detected in domestic commodities and the concentration range in which they occurred are given in Table 4.5. If quantities of priority pesticides are being brought in for crop application, residues should be detected in domestic crops. Notably, there were no violations of MRLs and very few hits for priority pesticides over this 32 month period. Detection limits vary depending on the compound residue. However, they are within the range of 5-50 ug/kg [5]. Agriculture Canada also states that:

"pesticides that were banned or have fallen into disuse are found very infrequently and only at the lowest concentration ranges. Pesticides in this latter group include many of the organochlorines, such as DDT and metabolites, aldrin, BHC, dieldrin, endrin, heptachlor, and lindane." [5]

Furthermore, Agriculture Canada also states: "commodities that mature on or below soil are found to contain these [priority] pesticides in higher frequency than in other foods" [6]. This implicates existing soil contamination as a possible source.

4.2.3 Export

CEPA Export Notification Tracking

Aldrin, dieldrin, chlordane, and DDT are listed on Schedule II, Part II, of CEPA which is the "List of Toxic Substances Requiring Export Notification". Under Section 42(3) of CEPA, notice of a proposed export of substances named to this list must be given by the exporter to the federal Minister of the Environment where export is to a country which is specified on the "List of Toxic Substances Authorities." To date, no export notifications have been received for aldrin, dieldrin, chlordane and DDT.

Mirex is listed in Part I of Schedule II of CEPA, which is the "List of Prohibited Substances". Prohibition constitutes no use of a substances as specified under Section 41(1) of CEPA. Under Section 41(2), prohibited substances cannot be exported except for the purpose of disposal.

TABLE 4.4: PESTICIDE RESIDUE ANALYSIS OF DOMESTIC AND IMPORTED COMMODITIES BY AGRICULTURE CANADA [5]

STATISTIC	DOMESTIC COMMODITIES	IMPORTED COMMODITIES
Number of samples tested	5,407	7,823
Number of residues detected	496 in 489 different samples	1823 in 1788 different samples
Residues detected (%)	9.04 %	22.85 %
Number of violations	24	200
Violations (%)	0.44 %	2.56 %
Number of samples with no detectable residues	4,894	5,835
Number of samples with no detectable residues (%)	90.51 %	74.59 %

**TABLE 4.5: NUMBER OF HITS AND VIOLATIONS
FOR PRIORITY PESTICIDE RESIDUES FOR DOMESTIC COMMODITIES [5]**

PESTICIDE RESIDUE	NUMBER OF HITS (AND CONCENTRATION RANGE IN WHICH IT OCCURRED)	TOTAL HITS	TOTAL VIOLATIONS
Aldrin	1 (to 0.05 ppm)	1	0
DDE	2 (to 0.05 ppm)	2	0
DDT	1 (to 0.05 ppm)	1	0
Dieldrin	5 (to 0.05 ppm) 1 (0.05 to 0.10 ppm)	6	0
Total (for all samples)	158 (to 0.05 ppm) 113 (0.05 to 0.10 ppm)	496	24

References:

- [1] Importation of Pest Control Products Solely for Manufacturing and Export - Proposed Program and Pilot Project, Discussion Document D94-05, Agriculture Canada, 1994, p.3.
- [2] Chemical Evaluation Search and Retrieval System (CESARS), Ministry of Environment and Energy and Michigan Department of Natural Resources.
- [3] "Exporting Banned and Hazardous Pesticides, 1991 Statistics, The Second Export Survey by the FASE Pesticide Project (Special Supplement)", Foundation for Advancements in Science and Education (FASE), Los Angeles, California, 1993.
- [4] Chemical Economics Handbook, SRI International, March 1993.
- [5] Neidert E., Trotman R.B, Saschenbrecker P.W., "Levels and Incidents of Pesticide Residues in Selected Agricultural Food Commodities Available in Canada", Journal of AOAC International., Vol. 77, No. 1, 1994, p.18.
- [6] Neidert E., Trotman R.B, Saschenbrecker P.W., "Levels and Incidents of Pesticide Residues in Selected Agricultural Food Commodities Available in Canada", Journal of AOAC International., Vol. 77, No. 1, 1994, p.22.
- [7] Pest Management Regulatory Agency, Product Manager for Dicofol. Personal communication. 1996.
- [8] Food Production and Inspection Branch, Agriculture and Agri-Food Canada, Ontario Region, Guelph, Ontario. Personal communication. 1996.

4.3 Commercial Distribution and Application

The conclusions of the various surveys and inspections conducted by MOEE imply that outstanding quantities of the banned pesticides within the commercial distribution and application sectors were collected prior to the provincial regulatory ban in 1994. There is no further evidence to suggest that the banned pesticides are being commercially applied or distributed at present.

At present, there are 1821 companies in Ontario with operator licenses. These licenses must be renewed annually. There are 27,202 active exterminator/applicator license holders in Ontario. Most exterminators work for an operator. An exterminator license must be renewed every five years.

4.3.1 MOEE Collection Programs

In the summer of 1993, the Standards Development Branch (SDB) of the MOEE conducted a stakeholder consultation of registrants of products of aldrin, dieldrin, chlordane and chlordecone (an industrially degraded product of mirex). The findings of the consultation are outlined below.

Aldrin and Dieldrin

Aldrin and dieldrin products were classified as "Schedule 1: Restricted" in Ontario. Under this schedule, applicators must be licensed exterminators and must obtain a permit for each application of a restricted product. Since there are a limited number of licensed exterminators in Ontario, it was determined that the only stock of either aldrin or dieldrin in Ontario was held by Aetna Pest Control. As a result, 227 L of aldrin and 23 L of dieldrin were collected and disposed of by contract to a secure land fill.

Chlordane

Minor domestic uses for chlordane were recognized and the possibility that homeowners were retaining small stocks. Further action was not taken by MOEE given that the focus of the stakeholder consultation was for the commercial application sector.

Chlordecone

As a result of the MOEE stakeholder consultation, 375 kg of chlordecone was collected and disposed of by contract to a secure landfill in Sarnia. Homeowners may, still however, inadvertently be holding domestic products with this active, in particular, ant trap products.

4.3.2 MOEE Compliance Inspections

During 1994, MOEE Investigation and Enforcement Officers and Pesticide Officers conducted an intensive province-wide compliance inspection program. This program, known as Project Herb 1994, was conducted in response to the concerns from the public and properly licensed exterminators about compliance with licensing and application procedures within the commercial application industry. Given that it was a province wide effort, all provincial officers received a standardized training package and instructions to help ensure uniform implementation of the program.

Project Herb was made up of two phases. Phase I consisted of random inspection of land exterminators during actual application. This phase was conducted from May 30, 1994 to June 3, 1994 and coincided with the peak of the spraying season. Phase II, consisted of inspection of pesticide operators offices and pesticide storage locations and inspection of golf courses. Phase II took place between August 29, 1994 and September 9, 1994.

A total of 547 inspections were conducted by provincial officers at residences, parks and rights-of-way; golf courses; and office and storage locations. A total of 169 charges were laid and 492 warnings were given. The majority of violations were a result of improper supervision and storage. Among the storage violations, improper storage of chlordane was found at some companies. These companies were given warnings and instructed to properly dispose of the products.

In addition to specific programs, the MOEE regional offices conduct random compliance inspections. There was very little to no evidence of banned pesticides found during these inspections. The MOEE Southwestern Regional Office conducted a survey on pesticide use and handling and has completed a random audit of farms. There was no evidence of banned pesticides on farms which were inspected.

4.3.3 MOEE Training Programs

At the time of writing of this report, the MOEE issues 53 different types of applicator licenses, through the Approvals Branch. Training brochures and information sheets are mailed to interested clients prior to their licensing test. A mail-out of the COA Objective 2.1 Backgrounder in all re-application packages is recommended as a way of ensuring more information dissemination.

4.4 Agricultural Use

The results of the Ontario Waste Agricultural Pesticide Collection Program 1991-92 conducted by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) confirm that all remaining products with the banned actives were disposed of and that the banned pesticides are no longer being used in the agricultural sector. There is no evidence provided by pesticide residue monitoring to suggest that the banned pesticides are being used on agricultural crops.

For context, 42.5% of total pesticides tonnage is used in agriculture according to Agriculture Canada [1].

4.4.1 Collection Programs

OMAFRA

In 1991-92, the Ontario Ministry of Agriculture and Food and Rural Affairs (OMAFRA) with MOEE conducted the Ontario Waste Agricultural Pesticides Collection Program. This program was widely publicized and quantities of banned pesticides were collected. These quantities are listed in Table 4.6. The table also shows that of the amount of orphaned stock collected, quantities were not large enough to be used in wide scale crop application.

MOEE / Laidlaw Waste Pesticide Disposal Pilot Project

A pilot project for the disposal of the waste registered and unregistered pesticide products has been set up by the MOEE Southwestern Regional Office and Laidlaw Environmental Services Ltd in London, Ontario. This site is intended primarily for the disposal of unwanted pesticide products originating from the agricultural sector. Other commercial sources will be considered provided they meet the generator registration exemption provisions under Ontario Regulation 347. Pesticides collected

at this Laidlaw site are sent either to the secure landfill in Sarnia or to a rotary kiln in the United States for disposal, based on the formulation type.

Other Laidlaw sites may be expanded for collection of unregistered pesticides, if warranted based on the results of this project. The London site provides a useful permanent transfer facility since temporary sites cannot store pesticides for long periods. More frequent transport to a secure landfill is required when temporary sites are used, which results in increased costs.

The Pesticide Disposal Pilot Project was initiated on August 8, 1995 and disposal fees are charged to users based on the formulation type. To date, none of the COA pesticides have been documented. More details of the pilot project are given in Box 4.2.

**TABLE 4.6: ONTARIO WASTE AGRICULTURAL
PESTICIDE COLLECTION PROGRAM [2]**

PESTICIDE ACTIVE	QUANTITY (KG)
Aldrin	153.0 kg
Chlordane	293.3 kg
DDT	1,180.0 kg
Dieldrin	69.1 kg

BOX 4.2: WASTE PESTICIDE DISPOSAL - PILOT PROJECT DETAILS MOEE SOUTHWESTERN REGION

A pilot project has been set up for the disposal of unwanted or unregistered pesticide products which originate in the agricultural sector of MOEE Southwestern Region.

Waste Contractor: Laidlaw Environmental Services Ltd.
Disposal Site Location: 2128 River Road, London, Ontario
Hours of Operation: 8 am - 5 pm, Monday to Friday
Contact: Mark Rombaugh
Telephone: (519) 451-6630

Disposal Details:

1. This site is intended primarily for the disposal of unwanted or unregistered pesticide products from the agricultural sector. Other commercial sources will be considered provided they meet the generator registration exemption provisions under Ontario Regulation 347. The MOEE Southwestern Regional Office should be contacted for further details regarding exemption.
2. Disposal site users are responsible for transporting the pesticides to the disposal site location.
3. Aerosol containers will not be accepted for disposal under this project.
4. Pesticide to be disposed of should be in the original container with a legible label. Products in secondary containers must be adequately marked to indicate contents. Laidlaw retains the right to refuse any questionable pesticide material brought in for disposal.
5. Disposal charges:
Dry formulations: \$1.50 per kilogram.
Liquid formulations: \$2.75 per litre. The volume of pesticide for disposal will be assessed based on either a half or full container and will take into account the water volume required to triple rinse the container.
6. Triple rinsed containers will be returned to the owners who will be responsible for taking them to one of the pesticide recycling sites for disposal. MOEE (Pesticide Control Staff) or the OMAFRA should be contacted for information as to the nearest site.
7. A bill of lading will be made out for each disposal site user which shows:
 - a. name and address of the user
 - b. type and amount/volume of each pesticide for disposal.A copy of this bill will be given to each user.
8. For further information, please contact Doug Morrow, MOEE, Southwestern Regional Office, at (519) 661-2255.

4.4.2 OMAFRA Pesticide Use Survey

OMAFRA conducts a Survey of Agricultural Pesticide Use every 5 years. Questionnaires are sent to 1,300 individual growers to cover virtually every type of crop that is produced in Ontario. The next survey is scheduled for 1998 and in support of this COA Objective, OMAFRA will include the COA 2.1 backgrounder and trade name fact sheet, in the mailing package to participants.

4.4.3 Training Program

Agricultural growers and pesticide vendors in Ontario are legally required to be re-certified under the Vendors and Growers Certification Program every five years, according to the Pesticides Act of Ontario. This program was put together in conjunction with MOEE, OMAFRA and farm organizations. This certification allows them to legally apply and use pesticides. Part of their instruction materials includes the Pesticides Act and their obligations under this Act. Banned pesticides will be highlighted in future courses to further disseminate the message concerning these pesticides.

4.4.4 Pesticide Residue Monitoring

The Provincial Pesticide Residue Testing Laboratory at the University of Guelph conducts continuous monitoring and screening for pesticide residues for OMAFRA. More than 500 samples of fresh fruit, vegetables and other commodities are analysed for pesticide residues each year. None of the banned products have been detected in residue samples.

A separate residue analysis program is conducted by OMAFRA and the Tobacco Board, with about 300 samples being analysed per year. Similarly, no residues of these products have been found.

References:

- [1] Neidert E., Trotman R.B, Saschenbrecker P.W., "Levels and Incidents of Pesticide Residues in Selected Agricultural Food Commodities Available in Canada", Journal of AOAC International., Vol. 77, No. 1, 1994, p.18.
- [2] MOEE Southwestern Region

4.5 Household Hazardous Waste

Pesticide collection from household sources is under the jurisdiction of Ontario municipalities and such collections are conducted during municipal hazardous waste days. In the past, the MOEE has provided grants for these hazardous waste days to municipalities. Priority for grants was first given to municipalities that had never received funds before and then, any to remaining municipalities which had been granted funds. At the time of the writing of this report, however, funding for HHW days from the province to the municipalities had been cut. The ministry has been working with industry and municipalities to expand HHW program through the promotion of product stewardship. Specifically, industry is encouraged to assume responsibility by collection and disposal of their manufactured product once they become waste.

Approximately 180 municipalities in Ontario have had at least one household hazardous waste day with some municipalities holding regular collections or maintaining permanent stations. Of the approximately 600 municipalities that have not had HHW collection days, approximately 170 of these are in Northern Ontario. The cost of collection and disposal of the HHW from these remote locations is prohibitive.

In terms of reporting, the Association for Municipal Recycling Coordinators (AMRC) prepares detailed composition studies of materials which are collected at municipal recycling sites. Both a provincial and an Environment Canada representative sit on the AMRC committee. The AMRC conducted sampling of HHW that was received at six different municipal HHW facilities from May to November 1995.

The results show that less than one per cent of the overall composition of HHW is made up of pesticide waste [1]. Exact values for total pesticide waste were not given in the AMRC report. However, insecticide waste was the largest pesticide waste category, followed by herbicide waste. Approximately 425 kg in container quantity and approximately 220 kg in residual quantity was collected within the insecticide waste category. The range of participation rates amongst the six municipalities was between 5 to 14 %. The pesticides category was not detailed any further in the AMRC report, so it was not possible to identify the percentage of COA priority pesticides which may have been collected.

Informal site visits to HHW depots in two municipalities (Hamilton-Wentworth and Peel Region) showed that priority pesticide products are being turned in as household hazardous waste and therefore, other quantities of these pesticides are perhaps being retained by householders. A more formalized monitoring of turn-in of COA pesticides was undertaken with Region of Peel. The pesticides that were most frequently turned in were DDT and chlordane. This correlates with the fact that these pesticides were the most recently

discontinued/banned ones. Pesticides collected as HHW are sent to Sarnia for disposal by incineration. Box 4.3 outlines the Peel Region monitoring initiative in more detail.

BOX 4.3: CASE STUDY

Collection of COA Priority Pesticide in Household Hazardous Waste At the Region of Peel Community Recycling Centre

The Region of Peel has three permanent recycling depots: Britannia Depot (in Mississauga), Brampton Depot, and Caledon Depot. Three of these accept household hazardous waste items, including pesticides (Britannia, Brampton and Caledon Depots). The region produces "Greentalk", a bi-annual newsletter for municipal residents which is a guide to Peel's waste reduction programs and initiatives. The newsletter is distributed door to door and in public offices. Pesticides collected as HHW are sent to Sarnia for disposal by incineration.

Peel Region agreed to sort the HHW pesticides which were turned in at the Britannia and Brampton for priority pesticides. An article was placed in "Greentalk" to inform residents of the initiative and to call for a turn in of these pesticides. Peel Region also agreed to provide these results to DOE/MOEE. This initiative served to begin the collection of banned pesticide HHW in Peel, as well as to offer an indicator of type and amount of banned pesticide which are likely to be present among householders. The amounts collected from January 3 to June 12, 1996 are listed below.

Results of Collection at the Brampton Recycling Facility

Priority Pesticide / Specific Product	Amount Collected	Volume Collected
CHLORDANE:	2000 g	3825 ml
• Soil & Lawn Insect Killer		
• 40% Chlordane E.C.		
• Ant & Grub Killer		
• Soil & Lawn Insect Dust		
• Ant, Cutworm & Grub Killer		
• Chlordane Insecticide		
• Ortho - Klor 44		
• Ortho - Chlordane		
• Chlordane 5%		
DDT:	300 g	460 ml
• Moth - Ded 5%		
• Ortho Rose Dust		

The total amounts of all HHW pesticides turned in during this period and sent for disposal were (based on packaging by drum):

January 1996	200 L drum
February 1996	100 L drum
March 1996	100 L drum.

References:

- [1] "Analysis of Household Hazardous Waste: Reduction and Management Study, Project 2: Municipal HHW Composition, Cost Analysis & Management Options Study, Draft Final Report", Chapter 4, Household Hazardous Waste Task Force, Association of Municipal Recycling Coordinators, Guelph, Ontario. February 1996.

5.0 CONCLUSIONS

5.1 Summary of Findings

A summary of the key findings of this report are given below. Recent scientific findings are also summarized.

In general, within the commercial sector of this province, there is effectively zero use and stock availability of the priority pesticides, based on the weight of evidence collected in this review. Within the hazardous waste sector, however, quantities (appropriate for domestic use) of priority pesticides may be inadvertently held by homeowners as household hazardous waste. At the same time, the indication is that pesticides as a whole do not make up a substantial part of household hazardous waste.

Federal Registration and Ontario Classification:

- Priority pesticide actives and end-use products for dieldrin, chlordane, DDT, and toxaphene are de-registered according to Pest Management Regulatory Agency database records.
- Mirex is prohibited from use under the Canadian Environmental Protection Act.
- Priority pesticide actives and end-use products of aldrin, dieldrin, chlordane, and DDT have been struck from the legal list of pesticides, which can be used in Ontario, under Regulation 914/90. The COA priority pesticides have been banned in Ontario in future in Regulation 162/94.

Manufacturing, Import and Export:

- There were in total 3 remaining historical manufacturers/formulators within Ontario of aldrin, dieldrin and chlordane product. These manufacturers were contacted before the ban in Ontario and they do not hold orphan stock.
- Border auditing by Agriculture and Agri-Foods Canada and Customs "refuse entry" immediately at the border for pesticides that are not legally registered in Canada.
- The priority pesticides, because they have been de-registered for environmental concerns, could not be imported into Canada solely for the purpose of manufacture (re-formulation) and subsequently exported to other countries under the Importation for Manufacturing and Export Program (IMEP).
- Pesticide residue monitoring of domestic food commodities, conducted by the Pest Management Regulatory Agency/Agriculture Canada, does not support the contention that priority pesticides are being illegally imported and applied to crops.
- Export notification is required for aldrin, dieldrin, chlordane and DDT under CEPA. No export notifications have been received, to date.

Commercial Distribution and Application:

- MOEE Standards Development Branch conducted a stakeholder consultation of the registrants of the priority pesticides in Summer 1993, before the implementation of the ban under Regulation 162/94. Remaining stocks of aldrin, dieldrin, and chlordane were collected.
- MOEE conducted Project Herb, a province wide compliance inspection program in Summer 1994. Some storage violations of chlordane were found. Companies were given a warning and instructed to properly dispose of the products.
- Information on priority pesticides and their status will be included in the MOEE Pesticides Licensing System Training Program, which trains and licenses commercial applicators.

Agricultural Use:

- OMAFRA conducted the Ontario Waste Agricultural Pesticides Collection Program in 1991-92. Aldrin, dieldrin, chlordane and DDT stocks were collected at that time. The priority pesticides did not exist in amounts which were substantial enough for significant use in crop applications.
- Information on priority pesticides and their status will be included in the OMAFRA Pesticide Use Survey 1998 to further inform 1,300 individual agriculturalists.
- Information on priority pesticides and their status will be included in the OMAFRA Vendors and Growers Certification Program.
- A Waste Pesticide Disposal Pilot Project to collect unwanted and unregistered pesticide products from the agricultural sector has been initiated by MOEE Southwestern Region and Laidlaw Environmental Services Ltd within that region.
- Priority pesticides have not been detected in provincial pesticide residue monitoring at the University of Guelph for OMAFRA.

Household Hazardous Waste:

- All pesticides, turned in as hazardous waste, account for less than one percent of all household hazardous waste according to AMRC reporting. Some waste priority pesticides are probably still being retained by households, given that some quantities (of DDT and chlordane) have turned up in household hazardous waste in two municipalities.

Recent Scientific Findings Specific to Priority Pesticides:

- Seasonal maxima in spring and summer for wet deposition of dieldrin (as well as, lindane and the endosulfans) are observed (Chan et.al. 1994).
- Dieldrin and PCBs are the predominant pollutants that were observed in Lake Erie, of 17 different toxic chemicals which were observed (Wang, et.al., 1994).

- Total chlordane concentrations were among the highest of OCs observed in remote northern lakes (Muir et.al., 1995).
- Chlordane concentration in water and suspended particulate matter from the St. Lawrence have remained constant since 1986 (while others have decreased). Seasonal fluxes have been observed (Quemerais et.al., 1994).
- DDT burdens in developed nations are declining (Loganathan and Kannan, 1994)
- Mirex has been observed in the entire food chain in the Great Lakes ecosystem. The mechanisms of removal that have been proposed are through outflow water to the St. Lawrence and migrating biota. A mass budget of mirex loading and fate in Lake Ontario-Gulf of St. Lawrence, suggests 2,700 kg has entered Lake Ontario and 550 kg has been removed to the St. Lawrence (Comba et.al., 1993).
- Toxaphene exhibits long range atmospheric transport. Wet fluxes for the five Great Lakes have been documented, although results are highly uncertain. Gas exchange appears to contribute more significantly than wet or dry deposition for the lake system (Hoff et.al., 1993).

5.2 Recommendations

The findings of this report show that significant work has been conducted to cut sources of the COA priority pesticides. In general, by-product sources and hazardous waste could be targetted as a next course of action. Specifically, the actions listed below could be undertaken, in addition to past work.

Federal

1. Include the fact sheet on COA Priority Pesticides in the Ontario portion of the federal Pesticide Use Survey, which collects sales data directly from pesticide registrants.
2. The Pest Management Regulatory Agency should be advised to further review the registration of pesticide actives (specifically, dicofol) with respect to DDT micro-contamination in light of the Toxic Substances Management Policy.

Provincial

3. Include the fact sheet on COA Priority Pesticides in the 1998 OMAFRA pesticide use survey.
4. Include the fact sheet on COA Priority Pesticides in Vendors and Growers Certification Program.
5. Include fact sheet on COA Priority Pesticides in pesticide licensing re-application packages for operators as sent out by the MOEE Approvals Branch, Pesticide Licensing.
6. Advise MOEE to review the classification of dicofol, in Ontario, in line with COA Objective 2.7.

Municipal

7. The federal and provincial governments should coordinate and work in partnership with the Association of Municipalities of Ontario (AMO), with a focus on COA priority pesticides.

APPENDIX A: RECENT FINDINGS IN FATE, SOURCES AND TRENDS

NO.	STUDY	STUDY CONDITIONS	STUDY FINDINGS
ALDRIN			
	No significant findings identified recently.		
DIELDRIN			
1.	<i>Individual-Based Model for Dieldrin Contamination in Lake Trout.</i> 1993. Madenjian, C. P., Carpenter S. R., Noguchi G. E.; Archives of Environmental Contamination & Toxicology, 24(1):78.	<ul style="list-style-type: none"> A mathematical model used to study variations in PCBs was used to study dieldrin concentrations in Lake Michigan trout. 	<ul style="list-style-type: none"> Predicted and observed concentrations of dieldrin were in good agreement. Results show that bioaccumulation of dieldrin is less efficient than that of PCBs by trout.
2.	<i>Status of Organic Contaminants in Lake Huron: Atmosphere, Water, Algae, Fish, Herring Gull Eggs, and Sediment.</i> 1985. Kreis R.G., Rice, C.P. Environmental Protection Agency, Great Lakes National Program Office. Report No. SR-114; EPA-R-00551.	<ul style="list-style-type: none"> Approximately 70 contaminants have been identified in lake basin and biota of Lake Huron. 	<ul style="list-style-type: none"> The contaminants reported most frequently and in highest concentrations are PCBs, DDT, dieldrin and mercury. Toxaphene is an emerging concern, further study needed.
3.	<i>Wet Deposition of Organochlorine Pesticides and Polychlorinated Biphenyls to the Great Lakes.</i> 1994. Chan C.H, Bruce G., Harrison B., Journal of Great Lakes Research. 20(3):546-560.	<ul style="list-style-type: none"> Wet precipitation samples were collected from Lake Superior, Lake Erie and Lake Ontario land stations. OCs and total PCBs were analysed from 1986-1991. 	<ul style="list-style-type: none"> Seasonal maxima in spring and summer were observed for wet deposition of dieldrin (as well as, lindane and endosulfans). Dieldrin (and lindane) concentrations declined in precipitation over the six year period. Fluxes of dieldrin (endosulfan and DDE) were higher in the lower great lakes. Year to year variations in wet deposition was estimated at about 45%.

APPENDIX A: RECENT FINDINGS IN FATE, SOURCES AND TRENDS

NO.	STUDY	STUDY CONDITIONS	STUDY FINDINGS
4.	<i>Application of Geographical Information Systems to Toxic Chemical Mapping in Lake Erie.</i> 1994. Wang J.F, Xie Y.M., Environmental Technology. 15(8):701-714.	<ul style="list-style-type: none"> Seventeen organic compounds were analysed using a Geographic Information System (GIS: i.e. SPANS) to show concentration distributions. 	<ul style="list-style-type: none"> Mapping results shows that higher concentrations of dieldrin occur in the West Basin, near the Detroit River. Dieldrin and PCBs are the predominant pollutants in Lake Erie. 95.6% of the total water in L.Erie showed moderate to low concentration of the selected toxic chemicals. GIS is suitable for mapping distributions of organic pollutants in large bodies of water.
CHLORDANE			
1.	<i>Spatial Trends and Historical Profiles of Organochlorine Pesticides in Arctic Lake Sediments.</i> 1995. Muir D. C. G., Grift L. W. L., Wilkinson P., Billeck B. N., Brunskill G. J., Science of the Total Environment, 161:447-457.	<ul style="list-style-type: none"> Sediment cores from eight remote Canadian Lakes were collected to examine latitudinal and temporal difference in deposition of OCs. 	<ul style="list-style-type: none"> Concentration of total chlordane, among others, was in the range of 0.1 to 3 ng/g at very northern locations and among the highest levels observed of OCs observed.
2.	<i>Concentrations and Sources of PCBs and Organochlorine Pesticides in the St. Lawrence River (Canada) and its tributaries.</i> 1994. Quemerais B., Lemieux C., Lum K. R., Chemosphere. 29(3):591-610.	<ul style="list-style-type: none"> OCs and PCBs in St. Lawrence water and suspended particulate matter was analysed from samples collected in 1991. Relative importance of the contaminants in the river were evaluated. 	<ul style="list-style-type: none"> PCBs were found to be the major contaminant in the river, followed by chlordane as an important contaminant. Chlordane concentrations have remained constant since 1986, while other contaminant concentrations have decreased (namely, PCBs and BHCs). Seasonal fluxes were observed. Fluxes are also linked with suspended particulate matter.
3.	<i>A National Fish Consumption Advisory Database- A Step Toward Consistency.</i> 1994. Cunningham P.A, Smith S. L., Tippet J. P., Greene A., Fisheries: 19 (5):14-23.	<ul style="list-style-type: none"> Fish consumption advisories were compiled by the Research Triangle Institute in 1990. 	<ul style="list-style-type: none"> Great Lakes states issued 73% of all fish advisories. Chlordane was one of four contaminants that were responsible for 90% of all advisories. (Other contaminants were: mercury, PCBs and dioxin.)

APPENDIX A: RECENT FINDINGS IN FATE, SOURCES AND TRENDS

NO.	STUDY	STUDY CONDITIONS	STUDY FINDINGS
4.	<i>Patterns of Accumulation of Airborne Organochlorine Contaminants in Lichen from the Upper Great Lakes Region of Ontario.</i> 1993. Muir D.C.G., Segstro M. D., Toom D., Eisenreich S. J., Macdonald C. R., Whelpdale D. M., Environmental Science and Technology. 27(6):1201-1210,	<ul style="list-style-type: none"> Accumulation of organochlorine contaminants was determined in lichen samples from 35 location in Ontario between 1985 - 1987. 	<ul style="list-style-type: none"> Concentrations of total chlordane (0.36 to 1.7 ng/g), as well as DDT and dieldrin, were significantly higher in the lichen from south-central Ontario as opposed to samples from northern or northwestern locations sites.
5.	<i>Monitoring Organochlorines in Blood of Sharp-Shinned Hawks (Accipiter-Striatus) Migrating through the Great Lakes.</i> 1993. Elliott J. E., Shutt L., Environmental Toxicology & Chemistry. 12(2):241-250.	<ul style="list-style-type: none"> This study investigated the potential for use of blood samples from banded birds of prey to estimate OC exposure of migrant birds on breeding and wintering grounds. Blood samples from sharp-shinned hawks were analysed for OC contaminants. 	<ul style="list-style-type: none"> Oxychlordane, among other OCs, increased significantly between migration and return in the second year in hatched-year birds. Residue levels of oxychlordane in adult birds did not change significantly between seasons (along with DDT and PCBs).
DDT			
1.	<i>Accumulation and Preliminary Inventory of Organochlorines in Great Lakes Sediments.</i> 1993. Golden K.A., Wong C.S., Jeremiason J.D., Eisenreich S.J., Sanders G., Hallgren J., Swackhamer D.L., Engstrom D.R., Long D.T., Water Science & Technology. 28(8-9):19-31.	<ul style="list-style-type: none"> Spatial and temporal concentrations and accumulation rates of PCB and DDT were examined through analysis of sediment cores from Lakes Superior, Michigan, and Ontario. 	<ul style="list-style-type: none"> PCBs in sediments estimates were determined to be: 4,900 kg in Lakes Superior; 75,000 kg in Lake Michigan; and, 110,000 kg in Lake Ontario.
2.	<i>Global Organochlorine Contamination Trends - An Overview.</i> 1994. Loganathan BG. Kannan K. Ambio, 23930:187-191.	<ul style="list-style-type: none"> Trends of OCs based on temporal trend studies in the global environment are discussed. 	<ul style="list-style-type: none"> DDT burdens in developed nations are declining.

APPENDIX A: RECENT FINDINGS IN FATE, SOURCES AND TRENDS

NO.	STUDY	STUDY CONDITIONS	STUDY FINDINGS
3.	<i>Organochlorine Contaminants and Eggshell Thinning in Grebes from Prairie Canada</i> . 1994. Forsyth D.J., Martin P.A., Desmet K.D., Riske M.E., Environmental Pollution, 85(1):51-58.	<ul style="list-style-type: none"> Eggs of five species of grebe were collected from Manitoba, Saskatchewan and Alberta from 1982. 	<ul style="list-style-type: none"> DDE and PCBs were found in all samples analysed (dieldrin and mirex were also found and at lower levels). Eggshell thickness of grebes declined significantly following the introduction of DDT (i.e. after 1947). It has recovered to some extent following DDT ban [discontinuation] in 1972.
4.	<i>The Occurrence, Distribution and Sources of DDT in the St. Lawrence River, Quebec</i> . 1993. Pham T., Lum K., Lemieux C., Chemosphere, 26(9):1595-1606.	<ul style="list-style-type: none"> St. Lawrence water suspended samples were collected and analysed for DDT and its metabolites at different periods. 	<ul style="list-style-type: none"> DDT parent compounds were present in almost all samples. Likely sources and contributions were: the Great Lakes (32%); tributaries (33%); atmospheric deposition (4%), and diffuse load from leaching and erosion process (31%).
5.	<i>Environmental Exposure and Lifestyle Predictors of Lead, Cadmium, PCB, and DDT Levels in Great Lakes Fish Eaters</i> . 1993. Hovinga M.E., Sowers M., Humphrey H.E.B., Archives of Environmental Health, 48(2):98-104.	<ul style="list-style-type: none"> 115 Great Lakes fish-eaters and 95 non-fish eaters which were previously studied were studied again in 1989. Blood serum PBCs and DDT level was measured. Lifestyle characteristics (i.e. recent and historic fish consumption) were evaluated as predictors of contamination levels. 	<ul style="list-style-type: none"> Historic fish consumption was the primary predictor of current serum levels.
6.	<i>Spatial Trends and Historical Profiles of Organochlorine Pesticides in Arctic Lake Sediments</i> . 1995. Muir D.C.G., Grift N.P., Lockhart W.L., Wilkinson P., Billeck B.N., Brunskill G.J., Science of the Total Environment.	<ul style="list-style-type: none"> Sediment cores collected from 8 remote lake in Canada to examine difference in deposition based on latitude and time. Analysis was by GC-ECD with confirmation by GC-MS. 	<ul style="list-style-type: none"> DDT declined significantly from 9.7 ng/g(dry weight) to 0.1 ng/g in Lake Hazen. Results generally supported predictions by the cold condensation hypothesis.

APPENDIX A: RECENT FINDINGS IN FATE, SOURCES AND TRENDS

NO.	STUDY	STUDY CONDITIONS	STUDY FINDINGS
7.	<i>Determinants of Polychlorinated Biphenyls (PCBs) in the Sera of Mothers and Children from Michigan Farms with PCB-Contaminated Silos.</i> 1994. Schantz S.L., Jacobson J.L., Humphrey H.E.B., Jacobson S.W., Welch R., Gasior D., Archives of Environmental Health, 49(6):452-458.	<ul style="list-style-type: none"> Blood samples taken from 28 mothers and 38 children who lived on farms in Michigan with contaminated silos analysed by column gas chromatography. Quantification was by the Webb-McCall method. DDT (pp-DDT + pp-DDE) was also analysed. 	<ul style="list-style-type: none"> DDT was found present in 66% of the children samples and in 93% of mothers samples. Concentration levels were higher in mothers than in children. DDE accounted for 89% of the total DDT in serum.
8.	<i>Comparison of Chlorinated Hydrocarbon Residues in Human Populations from the Great Lakes and Other Regions of Canada.</i> 1992. Mes J., Malcolm S., Chemosphere, 25(3): 417.	<ul style="list-style-type: none"> Samples of breast milk and adipose tissue were collected from people living in Great Lakes Basin. Data compared with that from across Canada. 	<ul style="list-style-type: none"> Median residue levels of pp-DDT and HCH were lower for Great Lakes residents than those in rest of Canada. Median level of PCBs in breast milk fat from mothers in Great Lakes Basin was markedly higher than from rest of Canada. Adipose tissue results were not significantly different except for PCB residue levels.
9.	<i>Status of Organic Contaminants in Lake Huron: Atmosphere, Water, Algae, Fish, Herring Gull Eggs, and Sediment.</i> 1985. Kreis R.G., Rice, C.P. Environmental Protection Agency, Great Lakes National Program Office. Report No. SR-114; EPA-R-00551.	<ul style="list-style-type: none"> Approximately 70 contaminants have been identified in basin and biota of Lake Huron. 	<ul style="list-style-type: none"> The contaminants reported most frequently and in highest concentrations are PCBs, DDT, dieldrin and mercury. Toxaphene is an emerging concern, further study needed.

APPENDIX A: RECENT FINDINGS IN FATE, SOURCES AND TRENDS

NO.	STUDY	STUDY CONDITIONS	STUDY FINDINGS
10.	<i>Geographical Distribution of Organochlorine Contaminants and Reproductive Parameters in Herring Gulls on Lake Superior in 1983.</i> 1994. Weseloh D.V.C., Ewins P.J., Struger J., Mineau P., Norstrum R.J., Environmental Monitoring & Assessment, 29(3):229-251.	<ul style="list-style-type: none"> Egg contaminant levels and reproductive output was determined in herring gulls on Lake Superior in 1983. Herring gulls have been used as an environmental monitor of contaminant levels since 1974. 	<ul style="list-style-type: none"> A range of OCs was found in most of the herring eggs: the main ones being DDE, PCBs, dieldrin, heptachlor epoxide, oxychlordane, HCB and mirex. Levels varied significantly among gull colonies. OC levels have declined up to 84% since 1974. The trend of eggshell thinning has reversed (results show: there are only 8% thinner than before DDT was introduced).
1.	<i>A Lake Ontario-Gulf of St. Lawrence Dynamic Mass Budget for Mirex.</i> October 1993. Comba M.E., Norstrom R.J., Colin R. Macdonald C.R., Kaiser K.L.E., Environmental Science and Technology, Vol. 27, No.10, p. 2198(9).	<ul style="list-style-type: none"> A mass budget and chronological profile of the mirex loading to and fate in the Lake Ontario-Gulf of St. Lawrence system. 	<ul style="list-style-type: none"> Mirex has entered the entire food chain because of its persistence and high lipophilicity and being removed mostly by out flowing water and migrating biota. Over the last 40year, 2,700 kg have entered Lake Ontario. 550 kg have moved to the St. Lawrence Estuary.
2.	<i>Mirex in the North American Great Lakes: New Detections and Their Confirmation.</i> 1993. Sergeant D.B., Munawar M., Hodson P.V., Bennie D. T, Haasts S.Y., Journal of Great Lakes Research, 19(1):145-157.	<ul style="list-style-type: none"> Previously Lake Ontario and the St. Lawrence River were identified as sources of mirex. Water and sediment from Lakes Erie, Huron, Michigan, and Isle Royale (Lake Superior) were analysed. Sucker and lake trout analysed for bioaccumulation levels, gas chromatography used. 	<ul style="list-style-type: none"> Mirex absent from most sediment samples. Mirex was at similar levels in all lakes when it was found in water. Fish levels were 100-200 times lower in Lakes Erie and Huron as compared to Lake Ontario.
3.	<i>Contaminant Trends in Lake Trout of the Upper Great Lakes.</i> 1985. DeVault, D.S., Willford, W.A., Hesselberg, R.J., Environmental Protection Agency, Great Lakes National Program Office.	<ul style="list-style-type: none"> Skin on coho salmon fillets analysed from Lakes Huron, Michigan, Erie, and Ontario. 	<ul style="list-style-type: none"> The highest concentration of mirex occurred in coho salmon from Lake Ontario and the lowest from Lake Erie. All residue levels were below those set by the USFDA, except for mirex and PCB in Lake Ontario.

APPENDIX A: RECENT FINDINGS IN FATE, SOURCES AND TRENDS

NO.	STUDY	STUDY CONDITIONS	STUDY FINDINGS
4.	<i>Spatial and Temporal Variations in Chemical Contamination of American Eels, Anguilla-Rostrata, Captured in the estuary of the St. Lawrence River.</i> 1994. Hodson P.V., Castonguay M., Couillard C.M., Desjardins C., Pelletier E., Mcleod R., Canadian Journal of Fisheries & Aquatic Sciences. 51(2):464-478.	<ul style="list-style-type: none"> Eels studied from 1982-1990 for levels of PCBs, mirex and pesticides. 	<ul style="list-style-type: none"> PCBs, mirex and pesticides were 10-100 times lower in migratory eels as compared to a non-migratory control group. Mirex has declined by 56% in eels in 1990 from 1982 levels. The percentage of eels exceeding human health guidelines was two times lower in 1990 than in 1982.
5.	<i>Uptake and Retention of Mirex by Fish Maintained on Formulated and Natural Diets in Lake Ontario Waters.</i> 1993. Makarewicz J.C., Buttner J.K., Lewis T.W., Progressive Fish-Culturist. 55(3):163-168.	<ul style="list-style-type: none"> Fish were grown in Lake Ontario waters under conditions which simulated commercial aquaculture to study bioaccumulation of mirex. 	<ul style="list-style-type: none"> Study showed that bioaccumulation of mirex under simulated commercial conditions was not significant.

APPENDIX A: RECENT FINDINGS IN FATE, SOURCES AND TRENDS

NO.	STUDY	STUDY CONDITIONS	STUDY FINDINGS
6.	<i>A Lake Ontario Gulf of St. Lawrence Dynamic Mass Budget for Mirex.</i> October 1993. Comba M.E., Norstrom R.J., Macdonald C.R., Kaiser K.L.E., Environmental Science & Technology, 27(10):2198-2206.	<ul style="list-style-type: none"> Measured and modelled results are used to generated a mass balance budget of mirex as far as the Gulf of St. Lawrence. 	<ul style="list-style-type: none"> Occurrence of mirex is restricted to Lake Ontario based on the two sources at the Niagara River and Oswego River. Mirex has entered the Lake Ontario food chain. Outflowing water and migration water are the major means of removal of mirex from Lake Ontario. Concentrations in Lake Ontario and the St. Lawrence are an indicator of past and present movement. 2,700kg of mirex has entered Lake Ontario over the last four decades. Approximately 550 kg has been removed to the St. Lawrence.
7.	<i>A 50-yr Record of Pollution by Nutrients, Trace Metals and Organic Chemicals in the St. Lawrence River.</i> 1994. Carignan R., Lorrain S., Lum K., Canadian Journal of Fisheries & Aquatic Sciences, 51(5):1088-1100.	<ul style="list-style-type: none"> A chronology of algal pigment; organic C, N, P; trace metals; and, organic contaminants for two fluvial lakes in the St. Lawrence. 	<ul style="list-style-type: none"> Organic contaminants: concentrations showed a decrease by 5 -10 times between mid-1960s to early 1980s, except for mirex. Pollution trends for organic contaminants appear to be influenced by river discharge as well as anthropogenic inputs.
TOXAPHENE			
1.	<i>Estimation of PCC Loadings from the Atmosphere to the Great Lakes.</i> 1993. Hoff R., M., Bidleman T.F., Eisenreich S. J., Chemosphere, 27(10):2047.	<ul style="list-style-type: none"> Estimates of wet and dry deposition of PCCs based on literature findings. Numerical models were presented in the study. 	<ul style="list-style-type: none"> Results are highly uncertain, but, wet flux is suggested to be in range of 3.5-12.5 kg/yr and dry flux is 1.5-6.3 kg/yr for the five Great Lakes. Gas exchange is more important than wet or dry deposition for Lake systems.
2.	<i>Spatial Trends and Historical Profiles of Organochlorine Pesticides in Arctic Lake Sediments.</i> 1995. Muir D. C. G., Grift L. W. L., Wilkinson P., Billeck B. N., Brunskill G. J., Science of the Total Environment, 161:447-457.	<ul style="list-style-type: none"> Sediment cores from eight remote lakes in Canada were collected to differences in deposition based on latitude and time. Analysis was by GC-ECD with confirmation by GC-MS. 	<ul style="list-style-type: none"> Concentration of toxaphene (along with other OCs) were in the range of 0.1-3 ng/g.

APPENDIX A: RECENT FINDINGS IN FATE, SOURCES AND TRENDS

NO.	STUDY	STUDY CONDITIONS	STUDY FINDINGS
3.	<i>High Resolution Selective Ion Monitoring GC-MS Determination of Toxaphene in Great Lakes Fish.</i> 1993. Andrews P., Newsome W. H., Boyle M., Collins P., Chemosphere, Vol. 27, No. 10, p. 1865.	<ul style="list-style-type: none"> Method used: gas chromatographic mass spectrometric devised to measure complex toxaphene residues in the environment. 	<ul style="list-style-type: none"> Toxaphene levels are determined to be parts per billion in fish on a wet weight basis and are species specific.
4.	<i>Environmental Contaminants in Eggs of the Common Snapping Turtle (Chelonia-Serpentina-Serpentina) from the Great Lakes St. Lawrence River Basin of Ontario, Canada (1981-1984),</i> 1993. Struger J., Elliott J.E., Bishop C.A., Obbard M.E., Norstrom R.J., Weseloh D.V.C., Journal of Great Lakes Research, 19(4):681-694.	<ul style="list-style-type: none"> Common snapping turtle eggs were collected from locations across Ontario and analysed for OCs. 	<ul style="list-style-type: none"> Eggs from Hamilton Harbour had trace amounts of toxaphene (as well as dicofol and octachlorostyrene). Significant statistical variation in concentrations was observed for OCs across sites.
5.	<i>Organochlorine Pesticides and Polychlorinated Biphenyl Congeners in Commercial Fish from the Great Lakes.</i> 1993. Newsome W.H., Andrews P., Journal of the AOAC International, 76(4):707-710.	<ul style="list-style-type: none"> Eleven fish species from the Great Lakes were analysed for residues of 39 PCB congeners and 24 Ocs. 	<ul style="list-style-type: none"> Toxaphene was the most abundant OC found in trout (pp-DDE was the most abundant organochlorine found in eel).

APPENDIX B: SUBSTANCE ASSESSMENTS

B.1 Federal Toxic Substances Management Policy

The federal Toxic Substances Management Policy (TSMP) is a framework with two tracks for the management of toxic substances within the Canadian Environment. **Track 1** substances are slated for *virtual elimination* from the environment if the substance characteristics meet or exceed *all* the criteria set for:

- Persistence
(Half-life in: Air ≥ 2 days;
 Water ≥ 182 days;
 Sediment ≥ 365 days; or
 Soil ≥ 182 days);
- Bioaccumulation
(BAF/BCF $\geq 5,000$ or log Kow ≥ 5.0);
- CEPA Toxic or CEPA toxic equivalent (i.e. international identification, assessment, or management); and,
- Predominately of anthropogenic origin (i.e. concentrations in the environment largely result from human activity).

Virtual elimination according to the policy implies:

- No measurable release or no generation / no use;
- Remediation
- International action

Track 2 substances are slated for *life-cycle management* if some, but not all, of the above criteria are met. Life-cycle management involves:

- Pollution Prevention
- Remediation
- International Action.

The COA priority pesticides meet or exceed the criteria for Track 1 (Virtual Elimination) of the TSMP.

APPENDIX B: SUBSTANCE ASSESSMENTS

B.2 Ontario Preliminary Environmental Assessment

The Ontario Preliminary Environmental Assessment gives scores to substances in 10 major categories, namely: environmental transport; persistence; bioaccumulation; acute lethality; non-mammalian sublethality; plant sublethality; mammalian sublethality; teratogenicity; mutagenicity; and, carcinogenicity ⁴. Table 2.1.1 summarizes the scoring of the assessment for each priority pesticides as issued as of November 1994, except for dieldrin for which there is no assessment. In addition, the scientific rationale for the scoring is provided in Part 6 of each Profile of Tier I Priority Substances (Appendix D).

The assessments are produced jointly by the Ontario Ministry of Environment and Energy and the Michigan Department of Natural Resources. They are provided through the Canadian Centre for Occupational Health and Safety as retrieved from the Chemical Evaluation and Retrieval System (CESARS).

Scoring of the Preliminary Environmental Assessments is from zero to a maximum of ten. A score of ten signifies the most severe concern. Score may also be qualified with the tags, that is:

- E = Estimated by model or analogy;
- Q = Qualified (data did not precisely match criteria or method was unusual;
- L = Limited data set; and,
- ** = Parameter cannot be scored due to lack of data in the available literature.

Scores for Environmental Transport for the priority pesticides were assigned based on results from Level I Fugacity Model estimates.

Aldrin

Scoring in the Preliminary Environmental Assessment indicates that the most severe concerns for aldrin are for:

- Environmental transport;
- Persistence in soil;
- Acute lethality in aquatic systems;
- Non-mammalian sublethality in aquatic systems;
- Oral mammalian sublethality; and,

⁴ Teratogenicity is the degree to which a substance can incite developmental malformations. Mutagenicity is the degree to which a substance can increase the frequency or extent of mutations in the genetic code. Carcinogenicity is the degree to which a substance can incite cancer, i.e. malignant tumour of potentially unlimited growth that expands locally by invasion and systematically transfer from one part of the body to another.

APPENDIX B: SUBSTANCE ASSESSMENTS

- Carcinogenicity.
Aldrin incorporated into soil has a half-life of greater than 10-15 weeks. Scores for bioaccumulation are based on bioconcentration factors in fish ranging from 2000-3140 while BCFs from invertebrates suggest even higher values than these.

Severe concern for aldrin exists for:

- Bioaccumulation;
- Plant sublethality in aquatic systems; and
- Teratogenicity; and mutagenicity.

Chlordane

The most severe concern for chlordane is in the areas of:

- Environmental transport;
- Persistence in soil;
- Bioaccumulation;
- Acute lethality in aquatic systems;
- Non-mammalian sublethality in aquatic systems;
- Oral and inhalation mammalian sublethality; and,
- Mutagenicity and carcinogenicity.

Severe concerns for chlordane also exists for:

- Aquatic plant sublethality; and,
- Teratogenicity.

DDT

The most severe concerns for DDT are:

- Persistence in air, water and soil;
- Bioaccumulation;
- Acute lethality in water;
- Non-mammalian sublethality in water.

Mirex

The most severe concerns for mirex are:

- Persistence in soil;
- Bioaccumulation; and,
- Aquatic plant sublethality.

The concern for persistence in soil is based on the bioavailability of mirex in contaminated soils for 200-600 years. This is based on actual residence time rather than half-life. Also, studies show that there is virtually no bacterial degradation over time. Bioconcentration factors (BCFs) in

APPENDIX B: SUBSTANCE ASSESSMENTS

fathead minnows have been reported as high as 56,000. Algae studies and effects in plankton and turtle grass constitute the very severe concern for aquatic plant sublethality.

Severe concerns for mirex exist for:

- Acute lethality in water;
- Oral mammalian sublethality; and,
- Teratogenicity.

Toxaphene

The most severe concerns for toxaphene exist for:

- Persistence in air, water and soil: In air, toxaphene has a half life of more than ten years; in water and soil, its half life is more than 11 years.
- Bioaccumulation: BCFs for freshwater fish are over 15, 000.
- Acute lethality in water;
- Non-mammalian sublethality in water;
- Mammalian sublethality, orally and by inhalation;
- Teratogenicity; mutagenicity; and, carcinogenicity.

APPENDIX B: SUBSTANCE ASSESSMENTS

**TABLE B.5: ONTARIO PRELIMINARY ENVIRONMENTAL ASSESSMENT -
SCORES FOR COA PRIORITY PESTICIDES**

Notes:

1. *E* = Estimated by model or analogy;
Q = Qualified (data did not precisely match criteria or method was unusual);
L = Limited data set; and,
** = Parameter cannot be scored due to lack of data in the available literature.
2. There is no Preliminary Assessment for dieldrin.

ASSESSMENT CATEGORY	PESTICIDE *				
	Aldrin	Chlordane	DDT	Mirex	Toxaphene
Environmental Transport	10E	10E	7E	**	0E
Persistence	10	10	10	10Q	10
a. Aquatic	4E	10L	10E	4L	10
b. Air	**	0L	10Q	**	10
c. Soil	10	**	10	10Q	10
Bioaccumulation	7	10	10	10	10
Acute Lethality	10	10	10	8	10
a. Aquatic	10	10	10	8	10
b. Oral	6	6	4	4	6
c. Inhalation	**	6L	**	**	0L
d. Dermal	4	4	4	2L	4
Non-mammalian Sublethality	10	10	10Q	6	10
a. Aquatic	10	10	10Q	6	10
b. Terrestrial	**	**	**	4	6
Plant Sublethality	8Q	8Q	8	10	8
a. Aquatic	8Q	8Q	8	10	8
b. Terrestrial	0	0	0	6	0
Mammalian Sublethality	10	10	10	8	10
a. Oral	10	10	10	8	10
b. Inhalation	**	10	**	**	10Q
Teratogenicity	8Q	8	8	8	10Q
Mutagenicity	8	10	8	0	10L
Carcinogenicity	10Q	10	8	8	10

C.1 Definitions and Terms

The following definitions were in effect while the priority pesticides were being de-registered ⁵.

Cancellation:

An action taken by Health Canada that ***immediately bans all trading of the product***, including sale and use. This is the most severe regulatory action which can be imposed on a product. The registrant may appeal this action, in writing to the Minister of Health within 30 days of the day on which the notice of regulatory action is received.

Suspension:

This action bans the further distribution by the ***registrant (manufacturers) of the product; i.e. the registrant (manufacturer) may not sell the product beyond the suspension date***. Remaining stock on the ***retail market may be sold legally and used until the expiry*** of the current registration period. The registrant may appeal this action, in writing to the Minister of Health, within 30 days of the day on which the notice of regulatory action is received.

Discontinuation:

Also referred to as ***voluntary withdrawal*** of registration or ***registration not renewed***. The product may be sold by the registrant so as to exhaust existing stocks through sale: "within reasonable time" or until the expiry of the current registration period. Registrants routinely choose to discontinue a product, at the time of registration renewal, by failing to apply for re-registration. As such, a product that is discontinued is "deemed to be registered" until the expiry of the next registration period; a registration period is five years. A registrant can ask for a withdrawal at any time during the registration period. The Minister of Health may specify any terms or conditions under which the registration will be discontinued.

⁵ Agriculture Canada, Registration Handbook for Pest Control Products under the Pest Control Products Act and Regulations, February 1994.

APPENDIX C: FEDERAL AND PROVINCIAL FRAMEWORKS FOR PESTICIDES

C.2 Federal Registration Process for Pesticides

Step #1:	<i>Submission of Application</i> An application for registration is submitted to the PMRA. The application package: <ul style="list-style-type: none">• identifies the applicant• lists the active ingredients and formulants• lists proposed uses• provides directions for use, precautionary information; disposal and clean-up procedures; and,• includes data required to support the clients claims; these data must be developed at independent laboratories or research institutes
Step #2:	<i>Distribution of Applications</i> The application package is verified to have all the required documentation. The package is then, distributed by the PMRA to the advisory departments: Environment, Health and Natural Resources Canada for review and comment.
Step #3:	<i>Registration of Active Ingredients</i> The active ingredient of a control product has to be (or should already be) registered first before end-use products are regulated. In the case where the active and end use products are not registered, two separate registrations may be required. Products which contain more than one active ingredient require a registration for each active ingredient, as well as a registration for the final end-use product.
Step #4:	<i>New Use Amendment</i> A registrant must submit an application for amendment of the registration before a new use can be added to the product label. The uses listed on a product label are the only uses that are permitted for that particular product. For example, a product registered for use outdoors may not be used indoors.
Step #5:	<i>Renewal of Registration (EXPORT)</i> An application for registration renewal or discontinuation must be received and processed before the expiry date on December 31 of a renewal year. The registration of a product is considered to have lapsed, otherwise. Products for which registration has not been renewed are <i>illegal to use, sell, or import</i> .

APPENDIX C: FEDERAL AND PROVINCIAL FRAMEWORKS FOR PESTICIDES

C.3 Federal Classes of Pesticides

CLASS	USE	CRITERIA		
		TOXICOLOGICAL AND ENVIRONMENTAL	PACKAGING	DISPOSAL
DOMESTIC	<ul style="list-style-type: none"> • Products for consumer use in/around dwelling • Intent is to provide relatively safe products for control of: insects; rodents within home; weeds in lawns and gardens; and for swimming pool disinfection. 	<ul style="list-style-type: none"> • Acute oral LD50 > 500 mg/kg. • Acute dermal LD50 > 1,000 mg/kg. • No special precautions or equipment for inhalation hazard. 	<ul style="list-style-type: none"> • Package sizes are limited to amounts that can be safely stored and used by consumers in a single session, where applicable. 	<ul style="list-style-type: none"> • Product and containers can be safely discarded through household garbage
COMMERCIAL (Also referred to as: AGRICULTURAL, INDUSTRIAL, or INSTITUTIONAL)	MARKETED FOR GENERAL USE: <ul style="list-style-type: none"> • Intended to provide agricultural and pest control operations with products that can be used safely and efficaciously. 	<ul style="list-style-type: none"> • Acute oral LD50 > 50 mg/kg • Acute dermal LD50 > 100 mg/kg 		
	RESTRICTED USES OF COMMERCIAL PRODUCTS: <ul style="list-style-type: none"> • Products which have inherent characteristics for "commercial" classification but have restricted uses • For relatively small scale but highly beneficial applications (e.g. aquatic herbicides) • These products can: <ol style="list-style-type: none"> be registered as a commercial and restricted products separately; or, Include a box on the commercial label which describes restricted uses and conditions. 	<ul style="list-style-type: none"> • Acute oral LD50 > 50 mg/kg • Acute dermal LD50 > 100 mg/kg 	<ul style="list-style-type: none"> • On the Commercial class product label: a box that identifies RESTRICTED use with a description of the additional essential conditions which are imposed • A "NATURE OF THE RESTRICTION" statement must appear directly under the heading "RESTRICTED USES". 	
	<ul style="list-style-type: none"> • Products are considered hazardous: due to inherent toxicity or for use on environmental sensitive areas (forestry or aquatic applications). • Intent is to limit availability of relatively hazardous products to situations where they can be used safely. 	<ul style="list-style-type: none"> • Acute oral LD50 is < 50 mg/kg. • Acute dermal LD50 < 100 mg/kg. • Significant environmental risk • Control products used in aquatic and forestry situations. 	•	
MANUFACTURING	<ul style="list-style-type: none"> • Products which contain active ingredient as: technical grade; manufacturing concentrate; or, integrated formulation for the purpose of manufacturing, formulation or repackaging into end-use products. • Such a product can be sold as an end-use and manufacturing product 		<ul style="list-style-type: none"> • Where the product is sold as a end-use and manufacturing product, one label suffices for both markets and the label should bear the appropriate classifications for the end-use market. 	

APPENDIX C: FEDERAL AND PROVINCIAL FRAMEWORKS FOR PESTICIDES

C.4 Ontario Schedules For Pesticide Products

Schedule:	1	2	3	4	5	6
Pesticide Type:	Restricted	Agricultural and Commercial	Consumer	Unrestricted	Restricted and Agricultural	Container Limitations on Unrestricted
Uses:	License and permit unless exempt	Agriculturists; licenced exterminators register custom sprayers	Agriculturists; licensed exterminators; Registered custom sprayers; General public	Yes: for wholesalers No: for retailers	Limited to agricultural uses; licensed land exterminators; registered custom sprayers	
Sale:	Wholesale vendors Class 1 retail vendors	Wholesale vendors Class 1,2 retail vendors	Wholesale vendor Class 1,2,3 retail vendor	Wholesale vendors; Limited wholesale vendors; Any type of retail outlet	Wholesale vendors; Class 1 retail vendors	Wholesaler vendors; Limited wholesalers; Class 1,2,3 retail vendor
Maintenance of Records:	Required: for each sale	Required.	Not required.	Not required.	Required for each sale.	Not required.
Federal Registration:			Agricultural, Industrial, Domestic	Domestic	Commercial Agricultural Restricted	Agricultural, Industrial, Commercial, Domestic
Hazard to health/ environment:	Serious hazard	Hazard	Minimal hazard No disposal problem in municipal garbage	Relatively innocuous	Serious hazard	Relatively innocuous

APPENDIX C: FEDERAL AND PROVINCIAL FRAMEWORKS FOR PESTICIDES

Schedule:	1	2	3	4	5	6
Pesticide Type:	Restricted	Agricultural and Commercial	Consumer	Unrestricted	Restricted and Agricultural	Container Limitations on Unrestricted
Hazard Specifics:	Persistent; metabolites are persistent. Inflict unnecessary suffering to pest vertebrate animals.	Moderately persistent (biologically active for more than 1 season), or potential to move from site through leaching or volatilization.		Formulations in very low concentrations; and,	High inhalation toxicities at normal temperatures.	
LD50 (acute oral): LD50 (acute dermal):	< 50 mg/kg <100 mg/kg	> 50 mg/kg; <500mg/kg < 1,000 mg/kg	>50 mg/kg; <5,000 mg/kg <10,000 mg/kg	> 5,000 mg/kg >10,000 mg/kg	< 50 mg/kg <100 mg/kg	
Other:		For products used in direct application to forest and/or aquatic habitats		Maximum packaging content not to exceed 1 kg or 1 litre. All containers must be approved by PAC according to packaging guidelines.	These products would normally be Schedule 1 but there is lack of effective or less hazardous alternatives.	Similar formulations to Schedule 4 (same active; same concentrations) but sold in containers of > 1 kg or 1 litre and do not meet guidelines of Sch.4.



THE CANADA-ONTARIO AGREEMENT

OBJECTIVE 2.1: CONFIRM ZERO DISCHARGE FOR FIVE PRIORITY SUBSTANCES

The purpose of this fact sheet is to:

- Inform you about this objective under the Canada-Ontario Agreement;
- Inform you of what to do in the case you have orphaned stocks of the priority substances in your possession;
- Answer other questions you may have concerning these substances.

What is the Canada-Ontario Agreement?

The Canada-Ontario Agreement (COA) is a six year federal provincial initiative which was signed in July 1994. This agreement calls for coordinated action to restore, protect, and sustain the Great Lakes Basin. Ministries of both the Ontario and federal governments have committed to working jointly on targets which fall into three streams:

- I. Restoration of degraded areas;
- II. Prevention and control of pollution; and,
- III. Conservation and protection of human and ecosystem health.

What is Objective 2.1?

Objective 2.1 is part of Stream II of the Canada-Ontario Agreement. It states that, the federal and Ontario governments agree to confirm that zero discharge has been achieved for 5 priority substances. In this target,

- **manufacturers,**
- **distributors, and,**
- **commercial applicators**

are accountable that there is **no production, use or import** of these pesticides in the Great Lakes Basin.

What are the five priority substances?

The priority substances of this objective were the pesticides:

- **aldrin / dieldrin,**
- **chlordane**
- **DDT,**
- **mirex, and,**
- **toxaphene.**

These are the most common names used for these substances. An accompanying fact sheet lists other trade names which may be specified on a product label.

Are there regulatory controls in place for these substances?

DDT, aldrin, dieldrin, chlordane have been **banned** in Ontario under Regulation 162/94. This regulation prohibits handling, storage, sale, transport and disposal. These pesticides can however be managed and disposed of as hazardous waste under the Ontario Environmental Protection Act and Regulation 347.

Mirex was never registered as a pesticide in Canada and therefore cannot be used legally in Canada as a pesticide. (Mirex was however, used as a fire retardant in Canada, at one time.)

All uses of toxaphene as a pesticide have been de-registered in Canada as of 1983 by the federal government.

Why are these substances targeted for zero discharge?

These priority substances are chlorinated hydrocarbon insecticides: they are toxic, very persistent in the environment and have the potential to accumulate in the food chain. Less hazardous insecticides are now available for the historical uses of these pesticides.

In 1985, the Great Lakes Water Quality Board of the International Joint Commission (IJC) identified 11 Critical Pollutants. Dieldrin, DDT and the substances it degrades into, mirex, and toxaphene were among the pollutants named to this list.

The IJC Critical Pollutants are considered a threat to the health and life within the Great Lakes ecosystem. The IJC has recommended that a focused strategy be implemented to cut pollution sources of these substances so that these substances can be virtually eliminated from the ecosystem.

What were these pesticides used?

- Aldrin, dieldrin, and chlordane were primarily used in the 1960's by farmers to control soil pests. Licensed applicators used aldrin, dieldrin and chlordane to control subterranean termites by injecting these pesticides into the soil surrounding and beneath termite infested structures.
 - DDT was used extensively in forestry, agriculture and for biting fly control.
 - Chlordane was also used to control soil pests in turf.
 - Mirex was used as a fire retardant.
- These priority substances were also used in formulations for domestic uses.

Are these pesticides still found in Ontario?

An Ontario Waste Agricultural Pesticides Collection Program was conducted in 1992 on a county by county basis. The purpose was to collect unwanted and deregistered agricultural pesticides. Aldrin, dieldrin and chlordane were collected during this program.

Farmers, may, however, still be inadvertently holding some stock. Homeowners, also, may still have or be storing domestic and lawn care products in their homes which contain, in particular: aldrin/dieldrin, DDT or chlordane.

If you have products which contain these priority substances...

If you are a homeowner who has domestic or lawn care products which contain the priority substances:

Please take these products to a municipal household hazardous waste site. Homeowners can contact their local municipality to obtain the address of a household hazardous waste depot.

If you are a retailer, distributor, or commercial applicator who has remaining agricultural or commercial stock:

Please call the provincial or federal numbers listed at the end of this fact sheet. Remaining agricultural or commercial stock is considered hazardous waste and can only be disposed of in accordance with the Ontario Environmental Protection Act.

A Waste Pesticide Disposal Pilot Project has also been developed by Laidlaw Environmental Services Ltd. at London, Ontario. This waste disposal site is intended for disposal of unwanted or unregistered pesticide products from in the agriculture. Other commercial sources will be considered provided that they meet the generator registration exemption provisions under Ontario Regulation 347. Please contact the local Ministry of Environment and Energy office for further details regarding this exemption.

If you are a farmer who may be inadvertently holding banned stocks....

Please contact your local municipality or Laidlaw Waste at the number listed below.

If you are a retail operation who may be inadvertently holding banned stocks...

Please contact your local municipality or Laidlaw Waste at the number listed below.

Contact Information

Ministry of Environment and Energy
135 St. Clair Avenue West
Toronto, Ontario, M4V 1P5
(416) 323-5200
Fax: (416) 314-7930

Environment Canada
4905 Dufferin Street
Downsview, Ontario, M3H 5T4
(416) 739-5861
Fax: (416) 739-4405

Waste Pesticide Disposal Pilot Project, London, Ont.:
Laidlaw Environmental Services Ltd.
2128 River Road, London, Ontario
Hours of operation: Monday-Friday, 8am-5pm.
Telephone: (519) 451-6630

Aussi disponible en français.

FACT SHEET #2:

SYNONYMS AND TRADE NAMES OF CANADA-ONTARIO AGREEMENT TIER I PRIORITY PESTICIDES

ALDRIN:					
Aldocit Aldric Aldrex 25 Aldrex 30	Aldrex 40 Algran Aldrine Aldocit	Aldric Aldrex 25 Aldrex 30 Aldrex 40	Algran Aldrine DrinoxTM Dimethonaphalene	ENT 15,949 Entoma 15949 Kortofin NCI-C00044	Octalene Rasayaldrin TM SD 2794 Seedrin Tatuzinho
DIELDRIN:					
Hexachloro-epoxy-octabhy endo- - dimethano-naphthanene HEOP Octablox Compound 497, endo-exo isomer of 1, 2, 3, 4, 10, 10-hexachloro-6,7,epoxy-1, 4, 4a, 5, 6, 8, 8a-octāhydro-1, 4, 5, 8-diemthanonaphthanline	1,4:5,8-dimethanonaphthalene, 1, 2, 3, 4, 10, 10-hexachloro-6, 7- epoxy-a, 4, 4a, 5, 6, 7, 8, 8a-octabhydro- enco, exo Alvit Dieldrix Dieldfrite		Illoxal NCI-C00124 Panoram D-31 Quintoxi		
CHLORDANE:					
Aspon-chlordane Belt CD 68 Chloordaan gamma-Chlordan Chlordane Chlordane (ACGIH, OSHA) Chlorindan Chlor Kil Chlorodane	Chlortox Chlordan Clordano Corodane Cortilan-Neu Dichlorochlordene Dow chlor ENT 9,932 ENT 25,552-X HCS 3260	Kilex Lindane KYPCHLOR Latka 1068 M 140 M 410 NCI-C00099 Niran Octachlor Octachlorodihydrodi-cyclopenta-diene	Octachlor0-4,7-methanohydroin dane Octachloro-4,7-Methanotetrahydroi-nidane Octā-klor Octaterr OMS 1437 Ortho-Klor RCRA Waste Number U036 SD 5532	Shell SD-5532 Starchlor Synklor Tat Chlor 4 Termi-ded Topichlor 20 Topichlor Topichlor 20 Toxichlor Unexam-Koeder	Velsicol 1068 4,7-Methano-1H-indene,1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro

FACT SHEET #2:

SYNONYMS AND TRADE NAMES OF CANADA-ONTARIO AGREEMENT TIER I PRIORITY PESTICIDES

DDT					
Arkotine Dicophane Estonate Gesarol Guesarol Neocid TechnicalChlorophenothane Zerdane; Ortho-para-DDT;	Benzene 1-chloro-2-[2,2,2,-trichloro-1 (4-chlorophenyl) ethyl]; Dichlorodiphenyl-trichloroethane; 1,1,1-Trichloro-2,2,-bis (p, chlorophenyl) ethane;	2,2-bis (p, chlorophenyl) - 1,1,1-trichloroethane; Alpha, alpha-bis (p-chlorophenyl) -beta, beta, beta-trichloroethane; Chlorophenothane Pentachlorin Detox 4,4'-DDT	Dicophane Estonate Gesafid Agritan Chlrofenotan Chlrophenotoxum Azotox Parachlorocidum Penticidum	Azotoxi M-33 Deoval Mutaoxan PEB 1 Dodat Mutoxan PEB 1 Dodat Bosan Supra	Bovidermol Ivoran Dibovin Clofenotane Aavero-Extra Chlorophenothan Citox Dykol Ent-1506 Anofex
MIREX:					
Mirex Dechlorane Cyclopentadiene hexachloro-dimer Bichorendo CG1283	Perchloropentacyclodecane; Dechlorane 515 Dechlorane 4070 Dechlorane plus Dechlorane plus 515	Dodecachloropentacyclodecane Ent 25,719 Dodecachloropentacyclo (3,2,2)-0(sup 2,6)0(sup 3,9) 0(sup 5,10) decane	Ferriamicide, 6c1283 Hexachlorocyclopentadiene dimer NCI C06428 Perchlorodihomocubane Perchloropentacyclodecane	Dodecachloroocta-hydro-1,2,3- metheno-2H-cyclobuta [c,d]pentalene;	Perchloropentacyclo[5.3.0.02, 6.03, 9.04, 8.]decane 1,3,4-Methano-dodecachlorooctahydro2H-cyclobuta (c,d) pentalene
TOXAPHENE:					
Alltox; Anatyxil Camphechlor; Camphochlor;	Canfechlor; Chorinated camphene; Estonox; Geniphene;	Hercules 3956; Kamfochlor; M 5055; Melipax;	PCC; PchK; Phenacice; Phenatox;	PkhF; Polychlorcamphene; Strobane T;	Toxakil; Toxaphen; Toxyphen



March 18, 1994
Ontario Regulation 162/94
Made: October 6, 1993
Filed: March 18, 1994
Gazette: April 2, 1994

DB-1

**REGULATION TO AMEND
REGULATION 914 OF REVISED REGULATIONS OF ONTARIO, 1990
MADE UNDER THE
PESTICIDES ACT**

1. Section 46 of Regulation 914 of Revised Regulations of Ontario, 1990 is revoked.

2. The heading immediately preceding section 62 of the Regulation, as made by section 15 of Ontario Regulation 27/91, is struck out and the following substituted:

Prohibited Pesticides

3. Section 62 of the Regulation is revoked and the following substituted:

62.-(1) No person shall use, handle, store, sell, transport or dispose of a pesticide that contains aldrin, chlordane, chlordane, dichlorodiphenyltrichloroethane (DDT), dieldrin or endrin.

(2) Despite subsection (1), a pesticide described in that subsection may be managed and disposed of as a hazardous waste in accordance with the Environmental Protection Act and the regulations under that Act.

4. Schedule 1 to the Regulation, as remade by section 3 of Ontario Regulation 15/93, is amended by striking out the following:

4385	SHM CGC	SHELL DIELDRIN 20 EC INSECTICIDE
4929	SHM CGC	SHELL ENDRIN 20 E.C. INSECTICIDE

.....

6468 SHM CGC SHELL ALDRIN 40EC INSECTICIDE

.....

17880 CGC	ALDRIN 400 EC INSECTICIDE
17896 CGC	ENDRIN 200 EC
17897 CGC	DIELDRIN 200 EC

5. Schedule 2 to the Regulation, as remade by section 4 of Ontario Regulation 15/93, is amended by striking out the following:

12865 SAF	CHLORDANE 8B EMULSIFIABLE CONCENTRATE INSECTICIDE
-----------	--

.....

17740 VEL CTX CHLORDANE C-100 EC INSECTICIDE

.....

19722 SAF	SANEX CHLORDANE 8B EC INSECTICIDE
-----------	-----------------------------------

6. Schedule 3 to the Regulation, as remade by section 5 of Ontario Regulation 15/93, is amended by striking out the following:

6024	SAF	CHLORO 2 INSECTICIDE
------	-----	----------------------

.....

11726 VIG	VIGORO ANT AND GRUB KILLER
-----------	----------------------------

.....

17607 SAF	SANEX ANT & GRUB KILLER
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7. Schedule 4 to the Regulation, as remade by section 6 of Ontario Regulation 15/93, is amended by striking out the following:

11471 CGC	GREEN CROSS ANT TRAP
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Agriculture
Canada

Food Production and
Inspection Branch

Direction générale de la production
et de l'inspection des aliments

Pesticides Directorate

Direction des pesticides

Canada

90-02

CAPCO Note

Note à l'ACRCP

Chlorinated Hydrocarbon
Insecticides:
Aldrin, Chlordane, DDT,
Dieldrin, and Endrin

Hydrocarbures chlorés
insecticides:
aldrine, chlordane, DDT,
dieldrine et endrine

1. Background

The chlorinated hydrocarbon insecticides have been registered for use in Canada for more than 25 years. This group of non-systemic, persistent insecticides was widely used to control insects in crops, and in domestic, forest and industrial situations. DDT has also been used more recently to control vertebrate pests.

This bulletin is published by the Pesticide Information Division of the Pesticides Directorate. For further information, please contact:

Pesticides Directorate
Agriculture Canada
Ottawa, Ontario
K1A 0C6
(613) 993-4544

Facsimile: (613) 998-1312
Telex: 053-3282
Envoy 100: Pesticide
National Pesticide Call-Line: 1-800-267-6315

1. Contexte

L'emploi des hydrocarbures chlorés insecticides est homologué au Canada depuis plus de 25 ans. Ce groupe d'insecticides non systémiques et rémanents a été largement employé pour lutter contre les insectes des végétaux et dans des usages domestiques, forestiers et industriels. Le DDT a également été employé plus récemment pour lutter contre les ravageurs vertébrés.

Ce bulletin d'information est préparé par le Secrétariat à l'information de la Direction des pesticides. Pour de plus amples renseignements, veuillez contacter :

Direction des pesticides
Agriculture Canada
Ottawa (Ontario)
K1A 0C6
(613) 993-4544

Facsimile : (613) 998-1312
Telex : 053-3282
Envoy 100 : Pesticide
Réseau national de renseignements sur les pesticides :
1-800-267-6315

The persistent nature of these products has resulted in the periodic re-evaluation of these compounds by Agriculture Canada and has systematically reduced their uses. Since the mid-1970's the registered uses for these products have been very limited. The following summarizes the current status of products and uses.

2. Current Status

a) Aldrin, Dieldrin, Chlordane

Products containing these active ingredients are restricted to use by licensed Pest Control Operators to control subterranean termites. Provincial use permits are required.

The following products are still registered:

1. Aldrin 40 EC
Registration No. 6468
Registrant: Shel International Chemical Co.
London, England
2. Dieldrin 20 EC
Registration No. 4385
Registrant: Shel International Chemical Co.
London, England

Des réévaluations périodiques de ces composés par le ministère de l'Agriculture du Canada ont systématiquement rétréci leurs profils d'emploi. Depuis le milieu des années 1970, les emplois homologués de ces produits ont été très limités. Ce qui suit est une description de la situation actuelle de ces produits et de leurs usages.

2. Situation actuelle

a) Aldrine, dieldrine, chlordane

L'application des produits renfermant ces matières actives est limitée strictement aux exterminateurs autorisés pour lutter contre les termites souterrains. Il faut pour cela des permis d'utilisation provinciaux.

Les produits suivants sont encore homologués:

1. Aldrin 40 EC
N° d'homologation 6468
Titulaire: Shell International Chemical Company, Londres
(Grande-Bretagne)
2. Dieldrin 20 EC
N° d'homologation 4385
Titulaire: Shell International Chemical Company, Londres
(Grande-Bretagne)

3. Technical Chlordane
Registration No. 19458
Registrant: Velsicol
Chemical Corp.,
Rosemont, Illinois

4. Chlordane C-100 EC
Registration No. 17740
Registrant: Velsicol
Chemical Corp.,
Rosemont, Illinois

5. Gardex 46% Chlordane EC
Registration No. 19725
Registrant: Gardex
Chemicals Ltd.,
Rexdale, Ontario

6. Sanex Chlordane 8E
Registration No. 19722
Registrant: Sanex
Chemicals Ltd.,
Mississauga, Ontario

The registrant, Shell International Chemical, has indicated that there will be no further manufacture of aldrin and dieldrin after 1989. No other manufacturers are known. Uses of all three chemicals are being discontinued in the United States and many European countries.

3. Technical Chlordane
N° d'homologation
19458
Titulaire: Velsicol
Chemical Corp.,
Rosemont (Illinois)

4. Chlordane C-100 EC
N° d'homologation
17740
Titulaire: Velsicol
Chemical Corp.,
Rosemont (Illinois)

5. Gardex, Chlordane
46 % EC
N° d'homologation
19725
Titulaire: Gardex
Chemicals Ltd.
Rexdale (Ontario)

6. Sanex Chlordane 8E
N° d'homologation
19722
Titulaire: Sanex
Chemicals Ltd.
Mississauga (Ontario)

Le titulaire, Shell International Chemical, a fait savoir que la production d'aldrine et de dieldrine prendra fin après 1989. Aucun autre fabricant n'est connu. L'emploi de ces trois produits chimiques est discontinué aux États-Unis et dans de nombreux pays d'Europe.

b) DDT

Registration of all DDT products was discontinued in 1985. The terms of discontinuation allow for use and sale of existing stocks until the next renewal date, December 31, 1990, when any sale or use would be a violation of sub-section 5(1) of the Pest Control Products Act and Section 6 of the Pest Control Products Regulations.

The discontinued products are:

1. Sanex Rodentrak
Registration No. 12202
Registrant: Sanex
Chemicals Ltd.,
Mississauga, Ontario
2. Poulin's Bat and Mouse
Doom Powder
Registration No. 8738
Registrant: Poulin Ltd.
Winnipeg, Manitoba

c) Endrin

The only registered product is Endrin 20EC, Registration No. 4929 manufactured by Shell International Chemical. This product is in the RESTRICTED class due to toxicity. There are no requirements for a provincial permit.

b) DDT

L'homologation de tous les produits renfermant du DDT a été discontinuée en 1985. Les conditions de l'arrêt de l'homologation prévoyaient l'utilisation et la vente des stocks existants jusqu'à la prochaine date de renouvellement, soit le 31 décembre 1990, date à laquelle tout emploi et toute vente constituerait une infraction au paragraphe 5(1) de la Loi sur les produits antiparasitaires et à l'article 6 du Règlement sur les produits antiparasitaires.

Les produits discontinués sont:

1. Sanex Rodentrak
N° d'homologation
12202
Titulaire: Sanex
Chemicals Ltd.,
Mississauga (Ontario)
2. Poulin's Bat and Mouse
Doom Powder
N° d'homologation
8738
Titulaire: Poulin Ltd.,
Winnipeg (Manitoba)

c) Endrine

Le seul produit homologué est Endrin 20EC, N° d'homologation 4929, fabriqué par Shell International Chemical. Ce produit appartient à la classe à USAGE RESTREINT en raison de sa toxicité. Aucun permis provincial n'est nécessaire.

Endrin currently has the following registered uses:

1. Cutworms: wheat, oats, barley, rapeseed
2. Army worms: flax, rapeseed, mustard
3. Aphids, flea beetles, potato beetles, tarnished plant bug: potatoes

Actual use of this product has been very limited for a number of years (since the late 1960's). Shell International Chemical has indicated that they will not manufacture endrin after 1989. Most countries, including Canada, have now stopped using this pesticide.

3. Summary

Substantive phaseout of most uses of these chlorinated hydrocarbon insecticides took place some 10 to 15 years ago based on environmental and safety concerns. Alternative products are now available for the remaining limited uses described above.

Les usages suivants de l'endrine sont actuellement homologués:

1. Vers-gris: blé, avoine, orge, colza
2. Légionnaires: lin, colza, moutarde
3. Pucerons, altises, altises de la pomme de terre, punaise terne: pommes de terre

L'emploi de ce produit, en fait, est très limité depuis un certain nombre d'années. Shell International Chemical a fait savoir qu'elle ne fabriquera plus d'endrine après 1989. La plupart des pays y compris le Canada ont maintenant cessé d'utiliser ce pesticide.

3. Sommaire

L'élimination de la plupart des emplois de ces hydrocarbures chlorés insecticides a commencé il y a quelque 10 à 15 ans en raison de craintes concernant l'environnement et l'innocuité. Il existe maintenant d'autres produits qui peuvent être appliqués aux usages limités décrits précédemment.

4. Proposed Regulatory Option

A number of possible regulatory options are summarized below:

- a) Cancel all registrations: this would stop all sale and use of these products. Disposal of remaining product would be governed by relevant provincial legislation. Environment Canada has agreed to provide advice in this area.
- b) Suspend all registrations: this would stop sale of these products by registrants and allow the Department to set a time frame for discontinuing use. Disposal of the remaining product would be governed by relevant provincial legislation.
- c) Discontinue all registrations at renewal on December 31, 1990: this would be done at the registrants' request, and would recognize that the production of these products has stopped. It would allow the Department to set a time frame for discontinuing use. DDT was already given the status of discontinued in

4. Options proposées d'ordre réglementaire

Ce qui suit résume un certain nombre d'option possibles d'ordre réglementaire.

- (a) Annuler toutes les homologations: Cette mesure arrêterait toute vente et tout usage de ces produits. La mise au rebut des produits restants serait régie par les lois provinciales pertinentes. Le ministère de l'Environnement du Canada a accepté de donner des conseils sur cette question.
- (b) Suspendre toutes les homologations: Cette mesure arrêterait la vente de ces produits par les titulaires et permettrait au ministère de dresser un calendrier de mise en oeuvre pour la discontinuation de l'usage. La mise au rebut des produits restants serait régie par les lois provinciales pertinentes.
- (c) Discontinuer l'homologation au moment du renouvellement le 31 décembre 1990: Cela se ferait à la demande du requérant et permettrait de reconnaître l'arrêt de la production de ces produits. Cette mesure permettrait au ministère de dresser un calendrier de mise en oeuvre pour la discontinuation de l'usage. Le DDT a déjà eu le statut de produit discontinué en 1985. Ce

1985. This status will automatically expire on December 31, 1990. Again disposal of remaining product would be governed by relevant provincial legislation.

statut prendra fin nécessairement le 31 décembre 1990. De nouveau, la mise au rebut du produit restant serait régie par les lois provinciales pertinentes.

5. Comments

Comments on these proposed regulatory options should be addressed to Mr. J.B. Reid, Audit and Enforcement Section, Pesticides Directorate, Agriculture Canada, (613) 993-4544. Deadline for comments is April 15, 1990.

5. Commentaires

Les commentaires sur ces options devraient être acheminés à M. J.B. Reid, Section de la vérification et de la réglementation, Direction des pesticides, ministère de l'Agriculture du Canada, (613) 993-4544. La date limite de réception des commentaires est le 15 avril 1990.

DISTRIBUTION:

Canadian Association of Pesticide
Control Officials
Public Interest Groups
User Groups

February 15, 1990

DIFFUSION:

Association canadienne des
responsables du contrôle des
pesticides
Groupes d'intérêts spéciaux
Groupes d'utilisateurs

le 15 février 1990

ALDRIN

Nature of Active Ingredient: Organochlorine insecticide
Active Code: H - ALD
Chemical Abstracts Number: 309-00-2
First date of Registration: July 1, 1950
Last Date of Registration: December 31, 1990
Regulatory Action: Discontinued
Reason for Discontinuation: Voluntary withdrawal of registration
PMRA Officer: Terry Caunter

History and Use Pattern: Widely used in Canada to control insect pests in crops and forests, and for domestic and industrial applications. In response to environmental and human health concerns, most Canadian uses of aldrin were phased-out in the 1970s. The persistent nature of this insecticide prompted periodic re-evaluations of its registration.

By the mid-1970s, use of aldrin was restricted to licensed pest control operators to control subterranean termites. In 1989, the registrant Shell International Chemical, indicated that there would be no further manufacture of the pesticide. The use against termites was voluntarily discontinued by the registrant in December 1990 with the understanding that existing stocks would be sold, used or disposed-of by the end of 1995. After this date, the sale or use of aldrin in Canada represents a violation of the *Pest Control Products Act*.

Aldrin is readily converted to dieldrin in the environment.

Total Number of Canadian Registered Products: 176

US Registration Status: No longer registered.

DIELDRIN

Nature of Active Ingredient: Organochlorine insecticide
Active Code: H - DIE
Chemical Abstracts Number: 60-57-1
First date of Registration: July 1, 1952
Last Date of Registration: December 31, 1990
Regulatory Action: Discontinued
Reason for Discontinuation: Voluntary withdrawal of registration
PMRA Officer: Terry Caunter

History and Use Pattern: Widely used in Canada to control insect pests in crops and forests, and for domestic and industrial applications. In response to environmental and human health concerns, most Canadian uses of dieldrin were phased out in the 1970s. The persistent nature of this insecticide prompted periodic re-evaluations of its registration.

By the mid-1970s, use of dieldrin was restricted to licensed pesticide applicators to control subterranean termites. In 1989, the last registrant, Shell International Chemical, indicated that there would be no further manufacture of the pesticide. The use against termites was discontinued by the registrant on December 31, 1990 with the understanding that existing stocks would be sold, used or disposed-of by the end of 1995. After this date, the sale or use of dieldrin in Canada represents a violation of the *Pest Control Products Act*.

Total Number of Registered Products: 75

US Registration Status: Registered, but severely restricted.

CHLORDANE

Nature of Active Ingredient: Organochlorine insecticide
Active Code: H - CLD
Chemical Abstracts Number: 57-74-9
First date of Registration: July 1, 1949
Last Date of Registration: December 31, 1990
Regulatory Action: Discontinued
Reason for Discontinuation: Voluntary withdrawal of registration
PMRA Officer: Terry Caunter

History and Use Pattern: Widely used in Canada to control insect pests in crops and forests, and for domestic and industrial applications. In response to environmental and safety concerns, most uses of chlordane were phased-out in the 1970s. The persistent nature of this insecticide and human health concerns prompted periodic re-evaluations of its registration.

On December 31, 1985, uses of chlordane were no longer registered with the exception of control of subterranean termites by licensed pesticide applicators. The uses against termites were voluntarily discontinued by the registrants on December 31, 1990, with the understanding that existing stocks would be sold, used or disposed-of by the end of 1995. After this date, the sale or use of chlordane in Canada represents a violation of the *Pest Control Products Act*.

Total Number of Canadian Registered Products: 289

US Registration Status: Registration cancelled in 1988.

The purpose of this Trade Memorandum is to set out acceptable use claims for products containing chlordane. All uses of chlordane except for control of subterranean termites will be suspended effective December 31, 1985. A suspension action will allow stocks of formulated chlordane held by dealers and distributors (not manufacturers or formulators) to be sold and used according to current labels.

After December 31, 1985, those products containing chlordane acceptable for registration shall have a RESTRICTED class registration and the label will contain the limitations and directions for use described in Appendix I.

RL/gy
0106E

Appendix 1

Front Panel

Chlordane* EC

Insecticide

RESTRICTED

DANGER POISON

READ THE LABEL BEFORE USING

GUARANTEE: Chlordane ... grams per litre

REGISTRATION NO. _____ PEST CONTROL PRODUCTS ACT

NET CONTENTS _____ Litres

Registrant Address

*Chlordane is a Registered trademark of
Velsicol Chemical Corp.

Secondary Panel

- 1 NOTICE TO USER: This control product is to be used only in accordance with the directions on this label. It is an offence under the Pest Control Products Act to use a control product under unsafe conditions.
- 2 NATURE OF RESTRICTION: For use only by licensed pest control operators authorized with permits by government to control subterranean termite populations infesting buildings; not for sale to the general public; for use only in areas designated as being termite infested areas.
- 3 RESTRICTED USES: For control or prevention of subterranean termite infestations in buildings or masonry structures by pest control operators licensed under Provincial authority. Chlordane is to be applied under a permit as a 1% emulsion of technical chlordane in water as a pretreatment of new construction or as a treatment to existing structures according to the accompanying Directions for Use. Use only as much chlordane emulsion necessary to form a continuous barrier against termite invasions. Chlordane can be applied only after proper site preparations, including removal of all wood/soil contact, have been completed. Attention should be paid to applicator safety and proper handling procedures. Consideration of the design of the structure, water table, soil type, soil compaction, grade condition and location and type of domestic water supplied will determine proper application methods. During and after treatment, clean-up of any spills is mandatory and drill holes must be properly sealed.
- 4 DIRECTIONS FOR USE

4.1 Site Preparation

Chlordane can control subterranean termites only when applied after proper site preparation.

- 4.1.1 New Constructions: Remove all wood and cellulose debris from property prior to erecting forms for pouring concrete. After pouring concrete slabs, walls, piers, etc., remove all framework wood from the building site. Do not use back fill containing wood or cellulose. It is important that new construction has a minimum wood-to-soil clearance of 50 cm in order to discourage termite invasion.

4.1.2 Existing Structures: Replace wood infested and damaged beyond repair. Correct conditions leading to abnormally high moisture in and around the structure, e.g., - grading, eaves troughing, etc. Break wood-soil contact by the following measures:

- remove all loose wood and other cellulose debris from property around the structure to be protected.
- ensure adequate clearance (50 cm) exists between soil and structural wood or support posts under porches or in crawl spaces. Excavate and pour new concrete piers if necessary. Wooden support ports can be replaced with steel jack posts.
- window sills below grade level require alteration employing a window well to retain soil.
- outdoor, wooden stair supports should be severed 10-15 cm above soil level and supported by concrete slabs or blocks.
- where wooden siding is used, lower grade to expose a minimum of 15 cm of foundation wall.
- repair all cracks or other points of entry for termites in foundation walls or concrete floors (e.g., expansion jackets, crevices, weeping tiles, utility holes, etc.) with a commercial sealant - preferably concrete.
- provide adequate ventilation for soil-surfaced crawl spaces under porches or living areas.

4.2 Mixing Instructions

Prior to mixing, inspect mixing tank, pumps, hoses and all fittings to ensure that all equipment is in good working order and that there are no leaks. Prepare a 1% chlordane emulsion by mixing 14 litres of Chlordane 720 EC with each 1000 litres of water. Mix by agitation and maintain gentle continuous agitation during application period. All chlordane applications are to be made through a vertical rod or sub-slab injector with a pressure from 200 to 350 kilopascals. Do not leave the mixing tank unattended during mixing or application periods.

4.3. Chlordane Application

4.3.1 Pre-treatment of New Construction. A 1% chlordane emulsion should be applied to the soil underneath and around concrete slabs, foundations, crawl spaces, piers etc., so as to provide a continuous chemical barrier against termite invasion. All product is to be applied by rodding. Flooding or percolating hose application is not permissible. Soil crawl spaces must be covered with a plastic vapour barrier after treatment and provided with adequate ventilation.

Slab on ground - Apply 5 litres emulsion/m² under the slab, attached porches and platforms before the concrete is poured, but after any forms are erected. The emulsion should be applied by rodding at 1 m intervals.

- Apply 6 litres emulsion/linear metre to the following critical areas under the slab before the concrete is poured: outside of foundation walls, under interior partition walls, under any footings and around utility services or other features that will penetrate the slab.
- If necessary to complete a chemical barrier, inject 1.3 litres emulsion into voids of all unit masonry foundation walls or piers at 0.5 m intervals. Wherever possible, drill injection holes on the outside of the foundation walls. Cap voids with vapour barrier in order to seal in chemical. Seal drill holes with good quality plugs and mortar.

Basement and Crawl Space Construction - Apply 5 litres emulsion/m² under basement or crawl space slab and attached porches and platforms prior to pouring concrete, but after forms are erected. The emulsion should be applied by rodding at 1 m intervals.

- Apply 6 litres emulsion/linear metre to the following critical areas under the basement slab or under a crawl space prior to construction: along outside edges of foundation walls, under interior partition walls, under or around piers, under footings, under stairway stringers, around utility services or other features that will penetrate the slab.

- Inject 1.5 litres emulsion into voids of all unit masonry foundation walls or piers at 0.5 m intervals. Wherever possible, drill injection holes on the outside of the foundation walls. Cap walls or piers with vapour barrier in order to seal in chemical. Seal drill holes with plugs and mortar.
- During back filling, apply 12 litres/linear metre to soil at a distance of approximately 30 cm from the outside of the foundation wall from top of footings to grade. Treat by rodding at 20-30 cm intervals.
- Apply 5 litres emulsion/m² to soil under crawl space by rodding at 1 m intervals. Cover treated soil with vapour barrier, provide adequate ventilation and a minimum clearance of 50 cm.

4.3.2 Existing Structures: Chlordane applications can be made to existing structures to discourage further or future termite damage in areas designated as being termite infested. Follow directions for site preparation above. Chlordane should be applied to soil along the exterior perimeter of the foundation, to the interior of foundation wall voids and support pier voids, along the interior perimeter of foundation, along partition walls, around support piers and stairway stringers. Treat wall voids from outside wherever possible.

All applications are to be made using the 1% chlordane emulsion. Apply chemical emulsion at a pressure of 200-300 kilopascals through rods or sub-slab injector. Reduce pressure in hard soils.

Treatment of exterior foundation perimeter:

- Apply 5 litres emulsion/linear metre/25 cm of penetration depth from grade to top of footings by rodding or injecting at 25-30 cm intervals. Chlordane must be applied so as to create an even barrier from grade down to the top of footings.
- concrete, asphalt or block sidewalks, driveways, patios, etc., adjacent to foundation must be drilled prior to rodding in chemical.

Treatment along interior walls of foundation:

- Concrete floor - drill holes at 30 to 40 cm intervals, 15-30 cm from the foundation and apply 5 litres emulsion per hole (7.5 litre/linear meter) with a sub-slab injector. Plug and seal drill holes with good quality mortar.

Soil Floor

- Excavate and level soil in order to provide sufficient clearance to allow rodding of chemical. Apply 5 litres per hole of chlordane emulsion by rodding at 30 to 40 cm intervals from the foundation (7.5 litres/linear metre). Vents must be installed to provide sufficient ventilation for crawl spaces. Treated soil must be covered by a vapour barrier (concrete or polyethylene) under living space areas.

Treatment of Wall Voids of Foundation

- Drill holes at 25 to 50 cm intervals just above grade level on the exterior surface of hollow foundation walls if possible (block construction, rubble walls, etc.). Inject chlordane emulsion at 5 litres/0.5 linear metre via a sub-slab injector.

Treatment Along Interior Partition Walls

- A basement partition wall extending into or through a concrete floor should be treated through a series of holes at 30-40 cm intervals on both sides of the wall. Apply 7.5 litres emulsion/linear metre with a sub-slab injector.
- A basement partition wall set on a slab floor should be treated as above but only on one side of the wall.

Support Posts and Piers

- Apply 6 litres of emulsion/m² to the base of support posts via a sub-slab injector for a concrete floor and via rodding for soil floors.

- If the post contains a void, inject emulsion into the void via a sub-slab injector at a rate of 7.5 litres emulsion/linear metre.

5. CAUTION: KEEP OUT OF REACH OF CHILDREN. Do not leave mixing tank or hoses containing unattended during mixing or treatment. Will cause toxic reactions or may be fatal if swallowed, inhaled or contacted with skin. Avoid breathing vapours or spray mist. Applicators must wear protective clothing inclusive of hand, foot and eye covering. A CSA-approved respirator must be used when applying chlordane. In an enclosed space provide adequate ventilation.

Do not store near feed or foodstuffs. This product is toxic to fish, birds and other wildlife. Keep out of lakes, streams and ponds. Do not contaminate water by cleaning of equipment or disposal of wastes. Do not plant food crops in soil adjacent to building where there has been a chlordane application.

Do not use, pour, spill or store near heat or open flame. Do not formulate with any diluent other than clean water.

6. FIRST AID: If swallowed, call a physician immediately. Contains petroleum distillate. Do not induce vomiting. Rush patient to nearest hospital or doctor and take the product label with you.

If on skin, wash with soap and water and remove contaminated clothing. If in eyes, flush with plenty of water for 15 minutes and contact a physician immediately. If inhaled, remove victim to fresh air, apply respiration if indicated and seek medical attention immediately.

7. TOXICOLOGY: Symptoms of chlordane poisoning are nausea, vomiting, hyperirritability and convulsions. Watch for developing pulmonary edema. The administration of barbituates is beneficial. Avoid adrenaline and morphine. Oxygen may be indicated.

8. DISPOSAL: Triple rinse empty insecticide container and add rinsate to mixing tank. Empty container should be made unsuitable for further use and disposed of according to Provincial requirements. For information on the disposal of unused, unwanted product and on the clean-up of spills, contact the regional office of the Environmental Protection Service, Environment Canada.

Roy G. Lidstone
Pesticides Division

RL/sn
0144E



FOOD PRODUCTION AND INSPECTION BRANCH	DIRECTION GÉNÉRALE, PRODUCTION ET INSPECTION DES ALIMENTS	DATE	
		October 31, 1983	R-1-218
		PESTICIDES	
MEMORANDUM TO REGISTRANTS			

Re: Proposed Revisions in the acceptable use claims for products containing **chlordane**

The purpose of this memorandum is to inform registrants of further proposed deletions from the chlordane use pattern.

The regulatory status of products containing chlordane was reviewed in 1970 and 1974-78. A decision to retain only essential uses was proposed in R-9 dated November 13, 1975 and implemented January 1, 1978 (T-1-14, T-1-108).

Concerns regarding both human and environmental safety exist with respect to chlordane. Margins of safety for human exposure can not be set. Chlordane at moderate high levels in the diet of at least 1 species of test animals (mice) is associated with an increase in the number of liver tumors.

Chlordane is persistent in soil and water. Soil applications can result in residues in root crops. Because chlordane is a complex mixture of numerous components, it is difficult to quantify in residue analyses. A number of European countries object to any residues over 0.01 ppm on food and also object to the level of sensitivity of the analytical methods. It would appear that continued Canadian use on food crops could interfere with international trade.

In view of the health and environmental concerns, and consistent with international actions, it would seem prudent to continue to limit human exposure of chlordane to a minimum. In recent years, safer and less persistent alternatives have become available. We have, therefore, decided to further reduce the acceptable range of chlordane uses in an attempt to further minimize human and environmental exposure.

The following revisions of the use pattern of chlordane are proposed:

- (1) Suspension of all domestic class products.
- (2) Suspension of all soil uses for food crops, including strawberries, potatoes, cole and other vegetable crops.
- (3) Suspension of all commercial and domestic class uses for soil inhabiting pests of ornamentals and turf.

- (4) Suspension of all structural pest control uses in a domestic setting except where applied by a licensed professional applicator.
- (5) Addition of a cautionary statement to labels of all commercial non-food structural use products restricting application for use by or under the supervision of governmental agencies or licensed professional pesticide applicators.
- (6) Suspension of all products containing chlordane in combination with other active ingredients.

A draft use pattern which outlines the label instructions acceptable for product registration as of January 1, 1985 is attached. It is proposed that all suspensions be effective June 1, 1985.

Any comments on this proposed regulatory action must be received by the Director, Pesticides Division, Food Production and Inspection Branch, Plant Health and Plant Products Directorate, K1A OC6, by June 1, 1984.

S.W. Ormrod
Director
Pesticides Division

DISTRIBUTION: RG KP KR PP PW PX

CHLORDANE

CLD-IN

COMMON NAME:CHEMICAL NAME:OTHER NAMES:CATEGORY:GUARANTEE IN TERMS OF:MARKETING TYPES:FORMULATIONS:

January, 1985 (pl)

chlordanes

1,2,3,4,5,6,7,8,-octachloro-3a,4,7,

7a-tetrahydro-4,7-methanoindane

chlordanes, Octo-Klor

insecticide

technical chlordanes

RESTRICTED, commercial

EC emulsifiable concentrate

SN solution

CAUTIONS: Keep out of reach of children. Poisonous if swallowed, inhaled, or absorbed through the skin. Avoid breathing the spray mist. Avoid skin contact. Wash with soap and water after using. Avoid contamination of food, feed, drinking water, and utensils. Do not contaminate any body of water. Do not apply to any animals or vegetable plants used for human consumption. Toxic to fish and wildlife. Do not formulate with any solvent, carrier, diluent, or emulsifier which causes an alkaline reaction.

SYMPTOMS OF POISONING: Irritability, convulsions, deep depression.

FIRST AID:

- A. Products containing Petroleum Distillate: In case of poisoning, call a physician immediately. IF ON SKIN, remove contaminated clothing and wash skin thoroughly with soap and water. IF IN EYES, flush with water for 5-10 minutes and obtain medical attention. IF SWALLOWED, DO NOT INDUCE VOMITING, but rush the patient to the nearest hospital or doctor's office, taking the pesticide container with you.
- B. Non-Petroleum Distillate Formulations: In case of poisoning, call a physician immediately. IF ON SKIN, remove contaminated clothing and wash skin thoroughly with soap and water. IF IN EYES, flush with water for 5-10 minutes and obtain medical attention. IF SWALLOWED, give the patient one to two glasses of water, and cause vomiting by giving one dose of syrup of ipecac. If ipecac is not available, give the patient one to two glasses of water and cause vomiting by inserting a finger down the throat. Repeat with water until vomit fluid is clear. The patient should be lying down with the head below the level of the feet. DO NOT TRY TO CAUSE VOMITING IF THE PATIENT IS UNCONSCIOUS OR IN A CONVULSIVE STATE.

TOXICOLOGICAL INFORMATION: The administration of barbiturates is beneficial. Avoid use of adrenaline and morphine. Oxygen may be indicated.

DECONTAMINATION AND DISPOSAL: For emulsifiable concentrates and solutions, rinse the empty containers thoroughly and add the rinsings to the spray mixture in the tank. Follow provincial instructions for any required additional cleaning of the container prior to its disposal. Make the empty container unsuitable for further use and dispose of it in accordance with provincial requirements. For information on the disposal of unused, unwanted product and the cleanup of spills contact the regional office of the Environmental Protection Service, Environment Canada.

LIMITATIONS:

1. Never use as a space spray
2. NATURE OF RESTRICTION: for use by or under the supervision of government agencies, professional applicators, or pest control operators.
3. Do not use in buildings where food is processed, handled or stored commercially or in buildings where animals are kept.
4. For commercial or industrial use only.

INDUSTRIAL PLANTS (NON-FOOD) AND COMMERCIAL BUILDINGS (INDOORS)
Carpenter ants

2-3% spray, #EC, SN

SPOT TREATMENT: Apply to surfaces where insects are found. Do not apply to animals or plants. Remove all animals, humans and food before application. Do not treat clothing, bedding or upholstered furniture.

Limitation (1)

BUILDINGS - OUTDOOR SURFACES
Carpenter ants

2-3% spray, #EC, SN

SPOT TREATMENT: Spray after dusk when insects are in the nest. Thoroughly soak the nest.

Limitations (2) (4)

FURNITURE, POLES, POSTS, WOOD (STRUCTURAL)
Carpenter ants

2% #SN

SPOT TREATMENT: Apply as a coarse wet spray or brush on infested wood. Where feasible, inject under pressure into insect burrows or galleries. For infestations requiring extensive treatment, use alternative control measures.

Limitations (3) (4)

BUILDINGS - FOUNDATIONS
termites

5-10 kg/1000L #EC

SOIL TREATMENT: Dig trench 20 cm wide and 60 cm deep next to the foundation. Apply to the soil at the rate of 15 L/m of trench.

Limitation (2)

JEH/sn
0528P

DDT

Nature of Active Ingredient: Organochlorine insecticide

Active Code: H - DDT

Chemical Abstracts Number: 50-29-3

First date of Registration: July 1, 1946

Last Date of Registration: December 31, 1985

Regulatory Action: Discontinued

Reason for Discontinuation: Voluntary withdrawal of registration

PMRA Officer: Terry Caunter

History and Use Pattern: Widely used in Canada to control insect pests in crops, and for domestic and industrial applications. Registration of all uses of DDT was discontinued in 1985 with the understanding that existing stocks would be sold, used or disposed of by the next registration renewal date of December 31, 1990. After this date, any sale or use of DDT in Canada represents a violation of the *Pest Control Products Act*.

Total Number of Canadian Registered Products: 920

US Registration Status: Registration discontinued in 1972.

**Agriculture Canada
Plant Industry Directorate**

January 1993

Historical Regulatory Actions-DDT

DDT
69.11.06
(T-1-26)

MANY USES DELETED OR REVISED.

DDT
69 SUMR
(NONE)

REVIEW OF USE PATTERN UNDERTAKEN.

DDT
70.01.21
(T-1-18)

USES REDUCED TO 15 FROM OVER 60. GUIDELINE FOR
DISPOSAL OF SURPLUS GIVEN.

DDT
71.12.31
(T-1-88)

DISCONTINUED SOME USE CLAIMS IN ACCORD WITH PM'S
STATEMENT. 69.11.03.

DDT
74.05.24
(R-1-1)

MORE CROP, STRUCTURAL USES SUSPENDED, BAT USES
LIMITED TO WHERE OTHER CONTROLS IMPRACTICAL, OR
RABIES FOUND. USE BY PCO AGAINST MICE IN STRUCTURES
ADDED.

DDT
75.11.06
(R-1-1)

PROPOSED SUSPENSION OF ALL PRODUCTS USED ON
FOOD/FEED CROPS. LIST OF ACCEPTABLE LABEL
INSTRUCTIONS AND LIMITATIONS.

DDT
76.06.16
(T-1-12)

SUSPENSION OF ALL FOOD CROP USES TO TAKE EFFECT
76.12.31 OR 78.12.31 [APPLE AND STRAWBERRY].

DDT
85.12.31
(RENEWAL)

PRODUCTS NOT RENEWED FOR 1986 AND BEYOND.

**Registration of all DDT products was discontinued December 31, 1985.
The terms of discontinuation allow for use and sale of existing stocks
until the next renewal date, December 31, 1990. DDT cannot be sold or
used in Canada beyond December 31, 1990.**

REGULATORY HISTORY OF DDT UNDER THE PEST CONTROL PRODUCT ACT
1968 - 1976

1. August 1968. Canadian Use Pattern for DDT before reevaluation.
2. June 11, 1969 (Memorandum T-26). Proposed reductions in the use pattern submitted to registrants and provincial regulatory authorities for comment.
3. November 6, 1969 (Memorandum T-26). Registrants and the public notified of reductions in use patterns acceptable for registration.

Deletions included:

- all uses on asparagus, kale, parsnips, peppers, spinach;
- all uses on the field crops beans, corn, and peas;
- all uses on forage crops;
- all uses in cattle barns and poultry houses;
- all uses on poultry;
- use on elms for elm bark beetles;
- space sprays in dwellings.

Revisions included:

- restriction of applications in dwellings, non-food industrial plants and storage areas to surface treatments;
 - limitation of louse control to medical prescription;
 - restriction of area control of biting flies to ground application under provincial permit.
4. January 21, 1970 (Memorandum T-18). Supplemental information issued re registration of DDT for 1970 and guidelines for disposal.
 5. March 15, 1972 (Memorandum T-88). Second revised list of uses acceptable for registration sent out.

Deletions included:

- use on beef cattle against biting flies.

Revisions included:

- limitation of use in tobacco to the Atlantic provinces;
- restriction of area control of biting flies to specific applications concurred by the Minister of Agriculture upon recommendation of the Federal Interdepartmental Committee on pesticides.

6. May 24, 1974 (Memorandum R-1). Proposed reductions in the use pattern submitted to registrants and to the provinces for comment:

Deletions included:

- all uses on beets, radish, rapeseed, tobacco;
- certain uses on celery, rutabaga, strawberry and in structures.

Revisions included:

- limitation of product for use against bats to situations where methods of repellency and mechanical exclusions are impractical and to geographical areas in which rabies has been reported.

Addition included:

- use by PCO's against mice in structures; this use not subject to registration under the Act of 1939; became subject in 1972.

7. November 6, 1975 (Memorandum R-1). Proposed reductions in the use pattern submitted to registrants and to the provinces for comment:

Proposed deletions included:

- suspension of all products for use on food and feed crops.

8. June 16, 1976 (Memorandum T-1-12). Product for remaining uses on food crops suspended, some suspensions effective December 31, 1976, and others December 31, 1978.

J. M. Stalker
June 2, 1977.

MIREX

Nature of Active Ingredient: N/A

Active Code: N/A

First date of Registration: N/A

Last Date of Registration: N/A

Reason for Discontinuation: N/A

History and Use Pattern: Mirex was never registered for use as a pesticide in Canada. It has been used in Canada as a fire retardant in a variety of commercial products. Mirex has been used worldwide as an insecticide for control of fire ants, termites and other insect pests.

Total Number of Registered Products: N/A

US Registration Status: A technical active was registered with EPA for use in controlling fire ants in several states. This registration was cancelled in 1987.

TOXAPHENE

Nature of Active Ingredient: Chlorinated camphene (insecticide and piscicide)

Active Code: H - TOX

Chemical Abstracts Number: 8001-35-2

First date of Registration: July 1, 1948

Last Date of Registration: December 31, 1982

Regulatory Action: Discontinued

Reason for Discontinuation: Voluntary withdrawal of registration.

PMRA Officer: Martha Farkas

History and Use Pattern: Toxaphene was registered for use in Canada as an insecticide and piscicide. In response to environmental and human health concerns, use of toxaphene on foliar crops was discontinued in 1970. The persistent nature of this insecticide prompted periodic re-evaluations of its registration.

All uses of toxaphene, except for veterinarian use on hogs, were ended on 31 October, 1980. On December 31, 1982, the registration of products containing toxaphene for veterinary use was voluntarily inactivated by the registrant (Burroughs Wellcome) with the understanding that existing stocks would be sold, used or disposed-of by December 31, 1985. After this date, the sale or use of toxaphene in Canada represents a violation of the *Pest Control Products Act*.

Total Number of Registered Products: 58

US Registration Status: Toxaphene was the most widely used insecticide in the US in the 1950s, mostly for control of pests of cotton. Toxaphene was banned by the EPA in January 1983.



FOOD PRODUCTION AND INSPECTION BRANCH DIRECTION GÉNÉRALE, PRODUCTION ET INSPECTION DES ALIMENTS	DATE October 31, 1980	T-1-231
	SECTION PESTICIDES	
RE OBJET TRADE MEMORANDUM		

RE: Changes in the Regulatory Status of Toxaphene

Products containing toxaphene have been registered for many years under the Pest Control Products Act. The regulatory status of products containing toxaphene was reviewed in 1970, and Memorandum T-1-65, dated November 9, 1970, notified registrants of the label instructions acceptable for registration at that time. The regulatory status of products containing toxaphene has now been re-reviewed. Memorandum R-1-7, dated September 30, 1974, notified registrants of this review. Memorandum R-1-7, re-issued March 5, 1979, set the date of implementation for January 1, 1981 to coincide with metric conversion. Memorandum R-1-202, dated May 1, 1980, requested the comments of registrants on proposed revisions in the regulatory status of toxaphene.

Recent studies indicate that toxaphene may be a health hazard. Toxaphene is persistent in the environment and, because it is composed of numerous components, is difficult to quantify in residue analyses.

In view of these concerns, it is considered prudent to limit human exposure to toxaphene to a minimum. The following suspensions are being implemented to minimize human exposure to toxaphene.

1. Suspension of registration of all products containing toxaphene in combination with other active ingredients, with the exception of a mixture with lindane for control of sarcoptic mange mites on hogs; products for this use will be RESTRICTED to veterinarians.
2. Suspension of registration of all products for use in orchards against rodents.
3. Increase in pre-slaughter interval on livestock from 4 to 12 weeks.
4. Suspension of registration of all products for use in residual sprays in farm buildings.
5. Suspension of registration of all products for use in dips for cattle and horses.
6. Suspension of registration of all products for use in backrubbers.

7. Suspension of registration of all products for control of lice on beef cattle.
8. Suspension of registration of all products for control of hog lice on hogs.
9. Suspension of registration of all products for control of lice, mosquitoes and stable flies on horses.
10. Suspension of registration of all products for control of lice on sheep.

The use pattern for toxaphene will be subject to re-review as additional scientific data becomes available.

This notice is issued under the authority of the Pest Control Products Act and Section 20 of the Regulations. Registrants should take note of Section 22 of the Regulations under the Pest Control Products Act for an understanding of the regulatory effects of a notice of suspension.

Registrants may amend their registration by submitting applications for amendment, including draft labels, in compliance with this memorandum. Applications for new registrations should include draft labels in compliance with this memorandum.

The attached Use Standard (coded A1) summarizes the label instructions for products containing toxaphene which will be eligible for full registration for 1981.

S.W. Ormrod
Associate Director (Pesticides)
Plant Products and Quarantine Division

This replaces Memorandum R-1-202 dated May 1, 1980.

Distribution: PPD-2, PCP-1,2,3,4,5,8,10,12

	TOXAPHENE	5
TOX-IN	October 1980 (A1)	7
COMMON NAME:	toxaphene	8
CHEMICAL NAME:	chlorinated camphene with a chlorine content of 67-69 per cent	9
CATEGORY:	insecticide	10
GUARANTEE IN TERMS OF:	toxaphene	11
MARKETING TYPE:	commercial, RESTRICTED	12
FORMULATIONS:	EC emulsifiable concentrate	13
CAUTIONS:	Harmful if swallowed, inhaled, or absorbed through the skin. Do not contaminate clothing. Do not contaminate lakes, streams, or ponds. Do not allow the dust or spray to drift onto adjoining food or forage crops. Do not contaminate feeds or foods.	17
SYMPTOMS OF POISONING:	Headache, weakness, blurred vision, excessive perspiration and nausea followed by abdominal cramps, vomiting, excessive salivation, constriction in the throat and chest, labored breathing, convulsions, and coma.	20
FIRST AID:	IF SWALLOWED, induce vomiting. Give a laxative such as epsom salts. Avoid liquid petrolatum or castor oil. Obtain prompt medical attention. FOR SKIN CONTACT, wash thoroughly with soap and water. IF IN THE EYES, flush with water.	24
TOXICOLOGICAL INFORMATION:	This product is an organochlorine insecticide. Barbiturates may be given to control convulsions.	28
DECONTAMINATION AND DISPOSAL:	Clean equipment and empty containers by thoroughly rinsing with water and dispose of rinsings by burying in non-crop land away from water supplies. Crush, break, or puncture empty containers and bury with the rinsings or deliver them to sanitary land-fill dumps in accordance with municipal requirements. For additional details on disposal of containers and rinsings and for information about the appropriate means of disposal of unused, unwanted product, contact the regional office of the Environmental Protection Service, Environment Canada.	31
LIMITATIONS:		38
1.	Do not treat dairy animals.	40
2.	Do not apply to meat animals within 12 weeks before slaughter.	42
3.	Do not dip young animals under 6 months of age. If pest control measures are necessary on young animals over 3 months of age, make a light spray application.	45
4.	For use in Western Canada.	47
5.	Do not use in feed lots.	49
6.	Do not spray on livestock during very hot or cold weather.	52
7.	Do not treat overheated or sick animals.	54
8.	NATURE OF RESTRICTION: For use only by, or under the supervision of, licensed veterinarians.	57
USE CLAIMS ACCEPTABLE FOR REGISTRATION IN CANADA		60
BEEF CATTLE		62
horn fly, ticks		63
3-5 kg/1000 L #EC		65
LIVESTOCK SPRAY:	Apply once in early season. For horn flies, use 2-5 L/ animal; for ticks, use 5 L/ animal.	68
Limitations (1)(2)(4)(5)(6)(7)		70
SHEEP		72
sheep ked		73
3-5 kg/1000 L #EC		75
LIVESTOCK SPRAY:	Apply 2-5 L/ animal. Repeat if necessary to maintain control.	76
LIVESTOCK DIP:	Use the 3 kg rate.	77
Limitations (2)(3)(6)(7)		78
HORSE		80
ticks		81

3-5 kg/1000 L #EC
LIVESTOCK SPRAY: Apply once per season, using 5 L/ animal.
Limitations (2)(4)(6)(7)

83
84
85

MIXTURES CONTAINING TOXAPHENE

87

1. with lindane (LIN)

89

HOG

91

sarcoptic mange mite

92

RESTRICTED TOX 3.25 kg + LIN 150 g/1000 L #EC
SPRAY: Spray to thoroughly wet animals. Repeat after 14 days. For use by
veterinarians only.
Limitations (2)(6)(7)(8)

94

97

99

<p>FOOD PRODUCTION AND INSPECTION BRANCH</p> <p>DIRECTION GÉNÉRALE, PRODUCTION ET INSPECTION DES ALIMENTS</p>	<p>DATE</p> <p>May 1, 1980</p>	<p>R-1-202</p>
	<p>SECTION</p> <p>PESTICIDES</p>	
<p>MEMORANDUM TO REGISTRANTS</p>		

RE: Proposed Revisions in Acceptable Use Claims for ~~toxaphene~~

The purpose of this memorandum is to request the comments of federal and provincial advisors and registrants on proposed revisions in acceptable use claims for toxaphene.

The regulatory status of products containing toxaphene was reviewed in 1969, and a number of revisions in acceptable label instructions were introduced. Memorandum T-65, October 9, 1970, lists the label instructions for products containing toxaphene that are at present acceptable for registration under the Pest Control Products Act.

In 1970 a re-review of the status of toxaphene was instituted. Memorandum R-7 dated September 30, 1974, notified registrants of this review and Memorandum R-1-7 dated March 5, 1979 set the date of implementation of January 1, 1981, to coincide with metric conversion.

Recent studies in the United States have indicated that toxaphene in the diet of test animals may be associated with an increase in tumors. Toxaphene is persistent in the environment and, because it is composed of numerous components, is difficult to quantify in residue analyses.

In view of these concerns, it would seem prudent to limit human exposure to toxaphene to a minimum. It is proposed to continue registration of products containing toxaphene for essential uses only. Additional changes in the regulatory status of toxaphene may take effect when suitable alternative control measures become available. The reduced use pattern and increase in pre-slaughter interval will help to minimize the possibilities of residues in human food and in the environment. We therefore propose the following revisions in the use standard for this compound:

1. Suspension of registration of all products containing toxaphene in combination with other active ingredients, with the exception of a mixture with lindane for control of sarcoptic mange mites on hogs; product for this use will be RESTRICTED to veterinarians.

2. Suspension of registration of all products for use in orchards against rodents.
3. Increase in pre-slaughter interval on livestock from 4 to 12 weeks.
4. Suspension of registration of all products for use in residual sprays in farm buildings.
5. Suspension of registration of all products for use in dips for cattle and horses.
6. Suspension of registration of all products for use in backrubbers.
7. Suspension of registration of all products for control of lice on beef cattle.
8. Suspension of registration of all products for control of hog lice on hogs.
9. Suspension of registration of all products for control of lice, mosquitoes and stable flies on horses.
10. Suspension of registration of all products for control of lice on sheep.

A draft use standard, summarizing the label instructions which will be acceptable for full registration for 1981 is attached.

Any comments on this proposed regulatory action should be sent to reach the Associate Director, Pesticides Section, Plant Products and Quarantine Division, Agriculture Canada, Neatby Bldg., Ottawa, Ontario K1A 0C6 by July 18, 1980.

S.W. Ormrod
Associate Director
Pesticides Section
Plant Products and Quarantine Division

This replaces Memorandum R-1-7, dated March 5, 1979

Distribution: Registrants of toxaphene,
PPD-2, PCP-3, 7,12

TOX-IN	May 1980 (P6)	5
TOXAPHENE		6
Common Name:	toxaphene	7
Chemical Name:	chlorinated camphene with a chlorine content of 67-69 per cent	8
Category:	insecticide	9
Guarantee in terms of:	toxaphene	10
Marketing Type:	commercial, RESTRICTED	11
Formulations:	EC emulsifiable concentrate	12
Cautions:	Harmful if swallowed, inhaled, or absorbed through the skin.	13
Do not contaminate clothing.	Do not contaminate lakes, streams, or ponds. Do not allow the dust or	14
spray to drift onto adjoining food or forage crops.	Do not contaminate feeds or foods.	15
Symptoms of Poisoning:	Headache, weakness, blurred vision, excessive perspiration and nausea	16
followed by abdominal cramps, vomiting, excessive salivation, constriction in the throat and chest,		17
labored breathing, convulsions, and coma.		18
First Aid:	IF SWALLOWED, induce vomiting. Give a laxative such as epsom salts.	19
Avoid liquid petrolatum or castor oil. Obtain prompt medical attention.	FOR SKIN CONTACT, wash	20
thoroughly with soap and water. IF IN THE EYES, flush with water.		21
Toxicological Information:	This product is an organochlorine insecticide. Barbiturates may be	22
given to control convulsions.		23
Decontamination and Disposal:	Clean equipment and empty containers by thoroughly rinsing with water	24
and dispose of rinsings by burying in non-crop land away from water supplies. Crush, break, or		25
puncture empty containers and bury with the rinsings or deliver them to sanitary land-fill dumps in		26
accordance with municipal requirements. For additional details on disposal of containers and rinsings		27
and for information about the appropriate means of disposal of unused, unwanted product, contact		28
the regional office of the Environmental Protection Service, Department of the Environment.		29
Limitations:		30
1.	Do not treat dairy animals.	31
2.	Do not apply to meat animals within 12 weeks before slaughter.	32
3.	Do not dip young animals under 6 months of age. If pest	33
control measures are necessary on young animals over 3 months of age, make a light spray application.		34
4.	For use in Western Canada.	35
5.	Do not use in feed lots.	36
6.	Do not spray on livestock during very hot or cold	37
weather.		38
7.	Do not treat overheated or sick animals.	39
8.	NATURE OF RESTRICTION: For use only by, or under the supervision	40
of, licensed veterinarians.		41
USE CLAIMS ACCEPTABLE FOR REGISTRATION IN CANADA		42
BEEF CATTLE		43
horn fly, ticks	3-5 kg/1000 L #EC	44
	LIVESTOCK SPRAY: Apply once in early season. For horn flies, use	45
	2-5 L/ animal; for ticks, use 5 L/ animal.	46
	Limitations (1) (2) (4) (5) (6) (7)	47
		48
SHEEP		49
sheep ked	3-5 kg/1000 L #EC	50
	LIVESTOCK SPRAY: Apply 2-5 L/ animal. Repeat if necessary to maintain	51
	control.	52
	LIVESTOCK DIP: Use the 3 kg rate.	53
	Limitations (2) (3) (6) (7)	54
		55
		56

HORSE
ticks

3-5 kg/1000 L #EC
LIVESTOCK SPRAY: Apply once per season, using 5 L/ animal.
Limitations (2)(4) (6) (7)

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66
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MIXTURES CONTAINING TOXAPHENE

1.
HOG
sarcoptic mange mite

with lindane (LIN)

RESTRICTED TOX 3.25 kg + LIN 150 g/1000 L #EC
SPRAY: Spray to thoroughly wet animals. Repeat after 14 days. For use
by veterinarians only.
Limitations (2) (6) (7) (8)

HC
79
.E5
C36
1996

Canada-Ontario agreement,
objective 2.1 : priority pesticides.
78379